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FINAL REPORT FOR RESOURCE RECOVERY CORPORATION PASCO, WASHINGTON

TDD R10-8410-14

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Report Date: June 1986

Submitted To: J.E. Osborn, Regional Project Officer
Field Operations and Technical Support Branch
U.S. Environmental Protection Agency
Region X

HAZARDOUS
SITE CONTROL
DIVISION

Remedial Planning/ Field Investigation Team (REM/FIT)

ZONE II

CONTRACT NO.
68-01-6692

CH2M HILL
Ecology &
Environment

ABSTRACT

Ecology and Environment, Inc. (E&E), Seattle, Washington conducted a Field Investigation at the Resource Recovery Corporation Waste Disposal Site in Pasco, Washington during July and August 1985. The investigation was designed to determine if industrial wastes buried at the site between 1972 and 1974 had migrated from several known buried disposal zones.

Resource Recovery Corporation (RRC) received and disposed of several million gallons of liquid industrial wastes consisting primarily of chlor-alkali sludge, acidic metal cleaning and metal finishing wastes, paints, resins, resin by-products, cutting oil, and other industrial materials; and 50,000 drums of material, including herbicide manufacturing wastes, paint and oil sludges, caustics, and empty pesticide containers.

Two monitoring wells were installed by E&E during this investigation downgradient of the ground water flow beneath each of the four disposal zones. One upgradient well was completed to establish background levels of contaminants.

Stainless steel monitoring wells were constructed and developed, and sampled together with several nearby existing monitoring wells. Ground water samples were collected for standard Hazardous Substance List (HSL) compounds and herbicides, and analyzed using the Environmental Protection Agency's Contract Laboratory Program (CLP) and EPA Region X Laboratory.

Soil samples were analyzed for the same parameters as ground water except for HSL volatile organic compounds. Soils in the area consisted primarily of sands and gravels from the surface to the maximum vertical extent of drilling, approximatley 100 feet below grade. Measured ground water elevations verified that the ground water gradient is to the southwest. Ground water was encountered between 40 and 77 feet below the land surface.

No evidence of herbicide or herbicide waste migration was found and only trace amounts of other contaminants were detected outside burial zones. There are no potable water wells within one mile downgradient of the site and it appears unlikely that nearby irrigation wells could be adversely affected.

Annual or biannual sampling and laboratory analyses of ground water collected from on-site monitoring wells is recommended as a precaution designed to detect any changes in water quality.

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DISCLAIMER

1.0 INTRODUCTION

A Field Investigation (FI) was conducted at the Resource Recovery Corporation Waste Disposal Site in Pasco, Washington during July and August 1985. The FI was conducted by the Ecology and Environment, Inc. (E&E) Seattle Field Investigation Team (FIT) in accordance with the United States Environmental Protection Agency (EPA) Technical Directive Document R10-8410-14.

Resource Recovery Corporation received and disposed of 50,000 drums and several million gallons of liquid industrial wastes in five burial zones at a site in Pasco, Washington between 1972 and 1974. Liquids were evaporated to dryness from both lined and unlined ponds; the remaining sludges were buried beneath layers of soil, polyethylene sheeting, and capped with an additional soil layer. Drums were stacked and buried with a similar liner system. Ecology and Environment, Inc.'s Seattle FIT installed nine monitoring wells and submitted both soil and ground water samples to EPA Contract Laboratories for analyses in an effort to determine if contaminants had migrated out of the burial zones.

Summarized in this report are investigation objectives and tasks, site history, environmental characteristics, sampling techniques and methodology, results of the investigation, analytical data, and conclusions and recommendations relevant to selection of future monitoring and/or cleanup activities.

The primary source of information for this report is data collected during the FI. Other data, primarily those generated during previous E&E site inspections of the facility, are used to complement and supplement the FI data base where appropriate.

2.0 INVESTIGATION OBJECTIVES AND TASKS

2.1 Objectives

The Field Investigation (FI) of Resource Recovery was designed to: 1) determine if wastes disposed of on-site by burial have migrated outside of the burial zones; 2) identify any contaminants found, and if possible, the source or sources; and 3) determine if further investigation of this site is necessary and recommend the form such future work should take based on data generated in this study. The overall investigative strategy is presented in Figure 2.1.

2.2 Tasks

To accomplish the above objectives, the FI was divided into five primary tasks. Brief summaries of the objectives of each task and the activities conducted are given below:

Task 1 - Project Initiation and Management

The purposes of this task were to solicit input from appropriate EPA, Washington State Department of Ecology (DOE), Franklin County personnel, and E&E project team members to define and initiate preparation of key project plans. Activities included project kickoff meetings, site reconnaissance, and preparation of the project work plan, quality assurance (QA) plan, health and safety plan, and sampling plan.

Task 2 - Initial Site Definition

The objective of this task was to obtain information and provide an initial description of the physical conditions at the Resource Recovery disposal site to develop of the detailed field investigation described in Task 3. Specific activities included compilation and review of existing chemical data for the site, preparation of a site map, and preliminary characterization of the site hydrologic features. Information for this

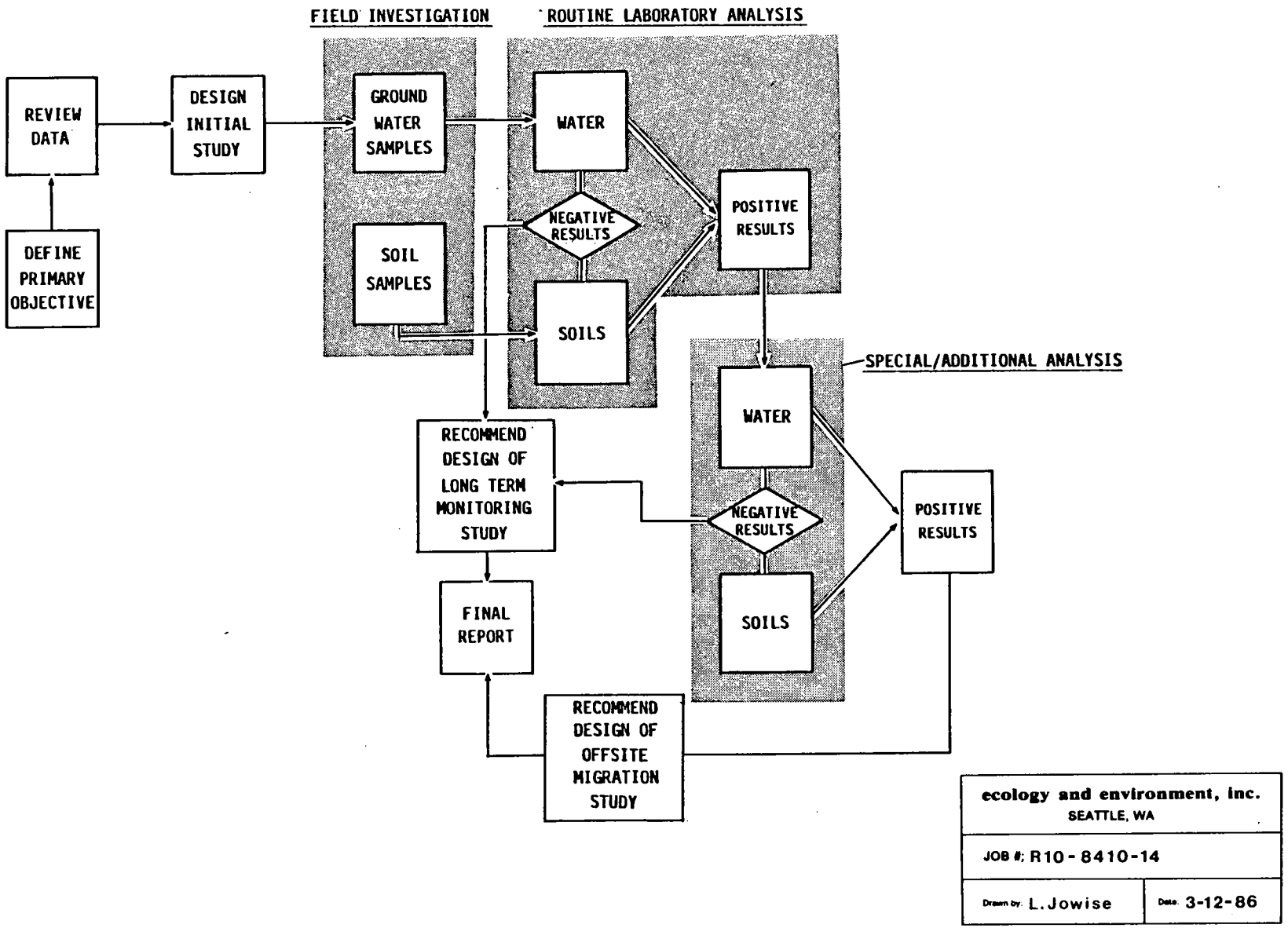


Figure 2.1 Investigation strategy, Resource Recovery Corporation, Pasco, Washington.

task was derived primarily from previous EPA activities at the site and reports prepared for the Department of Ecology by JUB Engineers, Inc. of Kennewick, Washington on the Pasco Sanitary Landfill (PSL), which contains within its boundaries the Resource Recovery disposal areas.

Task 3 - Detailed Site Investigations

Objectives of this task were to provide a description of the nature and extent of chemical contamination outside burial zones at the site and to create a data base sufficient for evaluation of potential future monitoring and/or cleanup activities. To accomplish these objectives, three phases of field activities were conducted: 1) soil and ground water characterization of each disposal zone and evaluation of the extent and magnitude of contamination immediately adjacent to each zone; 2) hydrogeologic characterization of ground water beneath the site; and 3) sampling monitoring wells constructed for the Pasco Sanitary Landfill by JUB Engineers, Inc.

Task 4 - Site Evaluation

Compilation, summarization, and interpretation of data collected at the site during the FI, and previous EPA (E&E) and JUB investigations were the objectives of this task. Activities included quality assurance (QA) review of the FI data base; compilation of chemical data and interpretation of the distribution and magnitude of contaminants in sediment and ground water; definition of ground water flow direction; and identification of specific sources and receptors of contamination. Emphasis was placed on investigating Resource Recovery burial zones and not landfill activities within the boundaries of the Pasco Sanitary Landfill.

Task 5 - Field Investigation Final Report

This report.

3.0 SITE HISTORY AND DESCRIPTION

This section summarizes pertinent background information and specific data related to the historical activities of Resource Recovery Corporation. Only those factors that may directly affect the potential for dispersal of buried wastes were considered.

3.1 Site Location

Resource Recovery Corporation's hazardous waste burial zones are within the boundaries of the Pasco Sanitary Landfill, located approximately 1.5 miles northeast of the City of Pasco, Washington. The landfill is in the southwest quarter of Section 15, and the northwest quarter of Section 22, Township 09 North, Range 30 East, Willamette Meridian, Franklin County, Washington (Figures 3.1 and 3.2). The nearest cross streets are Kahlotus Road and Washington State Route 12. The latitude is 46°15'07"N and the longitude is 119°03'13"W (1, 2).

3.2 Site History

Pasco Sanitary Landfill, originally known as the Basin Disposal Company dump site, was owned and operated by John Dietrich as a municipal waste open burning dump from 1956 to 1971. In 1971 all burning was halted and the site was converted into a sanitary landfill. In 1974, Pasco Sanitary Landfill began accepting large quantities of septic wastes for open pit disposal. In 1981, Larry Dietrich took over as owner and operator of Pasco Sanitary Landfill (3). The site is currently operated as an active landfill.

Resource Recovery Corporation (RRC) was formed by a partnership between Basin Disposal Company and Chemical Processors, Inc., of Seattle (Larry Dietrich, Waste Site Operator/Manager). RRC leased a portion of the Pasco Sanitary Landfill (PSL) in 1972 and began operations as a regional

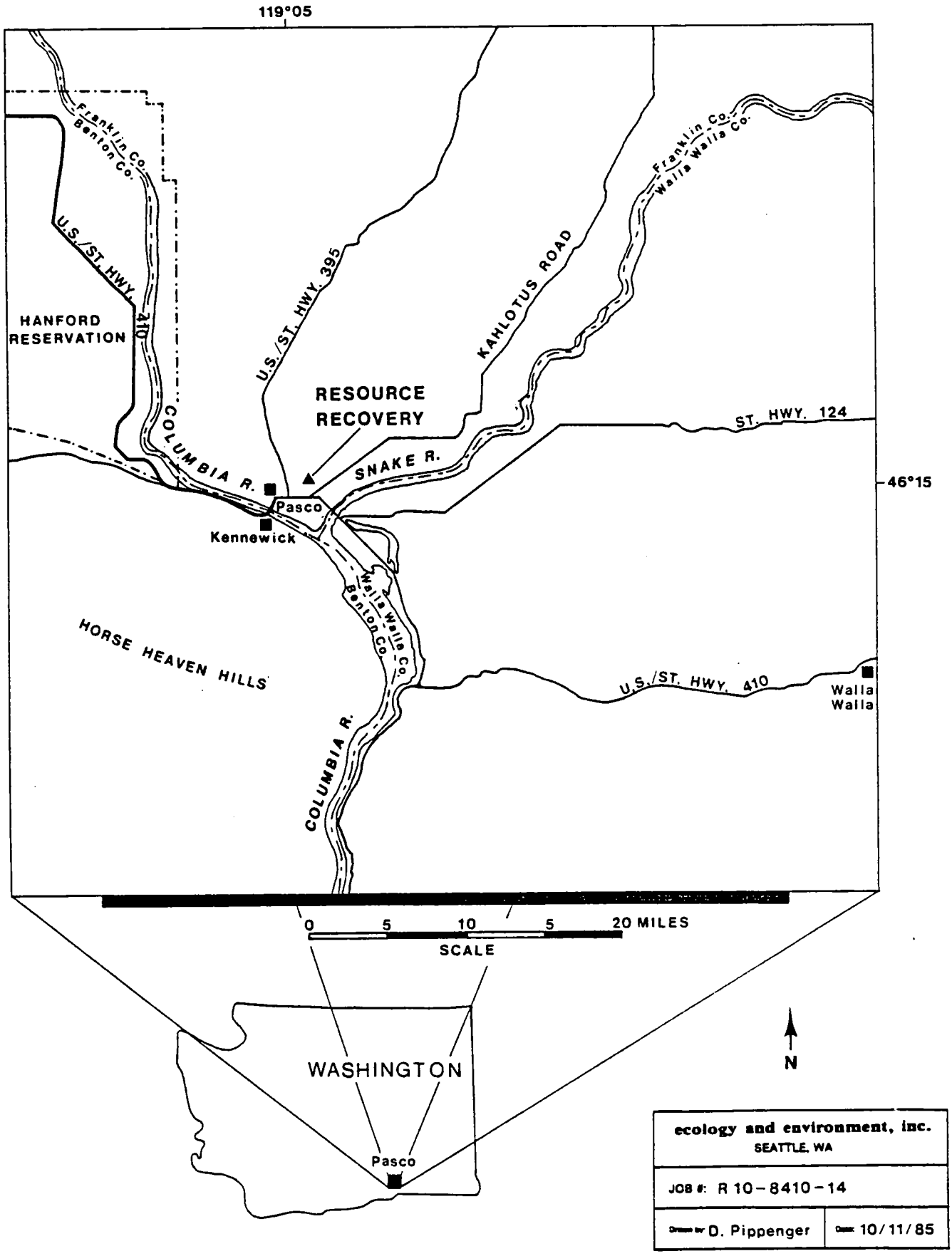


Figure 3.1 Location map, Resource Recovery Corporation, Pasco, Washington.

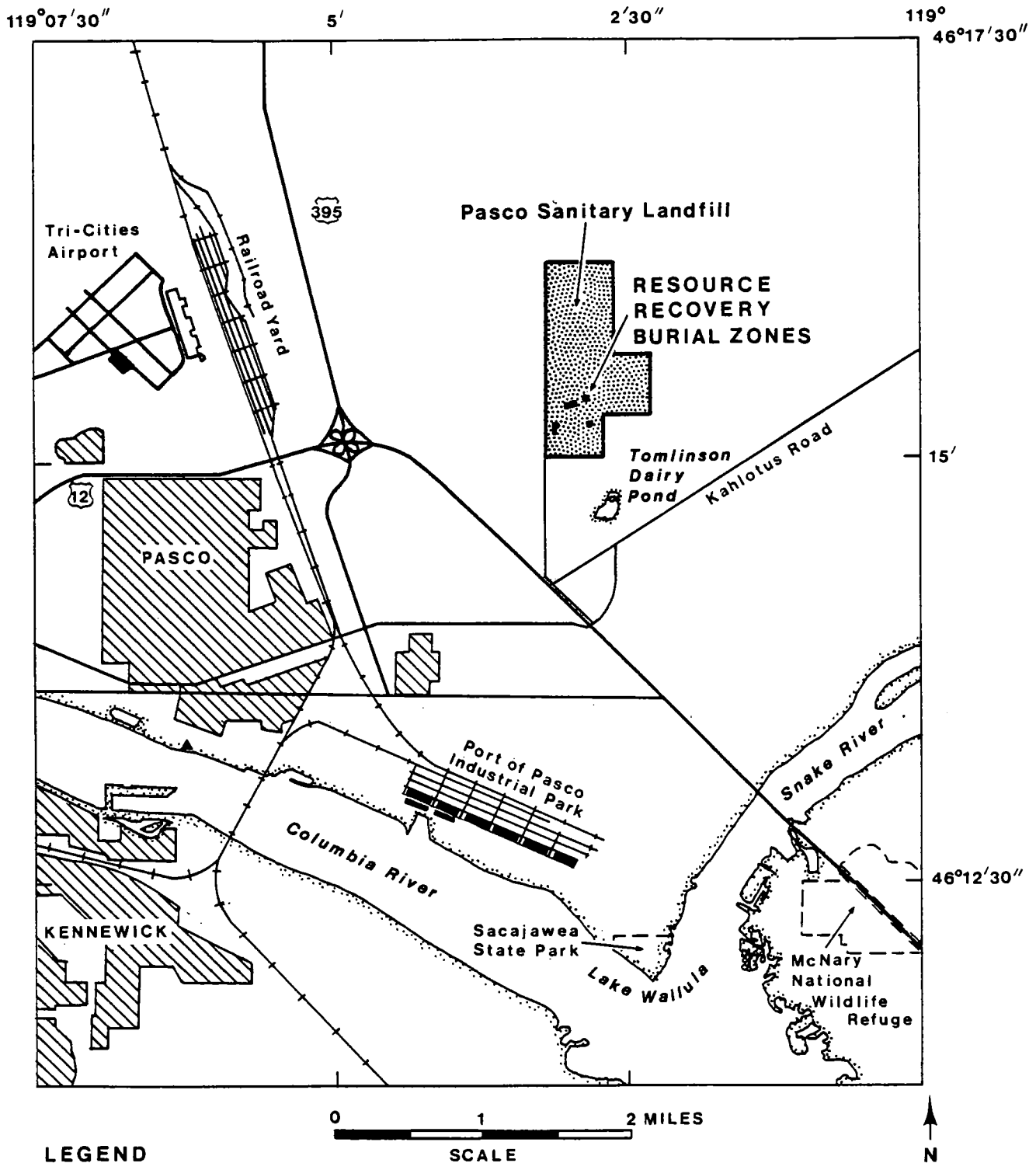


Figure 3.2 Vicinity map, Resource Recovery study area, Pasco, Washington.

hazardous waste disposal site under a Washington Department of Ecology Permit No. 5301 issued March 21, 1973 (4). The site accepted potentially hazardous wastes from various sources between early 1972 and December 1974.

3.3 Waste Management Practices

According to recent interviews and past records (5, 6, 7), RRC, at least to some degree, segregated wastes into five zones at the disposal site (Table 3.1 and Figure 3.3). A portion of the site, hereafter referred to as Zone A, had been used for disposal of paint wastes prior to the Resource Recovery takeover. Resource Recovery records stated that drums were stacked on end, usually three levels high after their operation began. The space between drums was backfilled with common debris, empty pesticide drums, and small, unidentified amounts of waste. The PSL pit is reported to contain drums of paint wastes, pesticide residues, wood treatment wastes, used etching solutions, metal castings wastes, and laboratory chemicals. No free liquids were discharged into this pit. Maximum burial depth of Zone A is reported to be less than 30 feet below the present surface. The west side of Zone A was utilized for open burning of municipal waste, which was intermittently compacted. The burned area extends approximately 75 feet from the western edge of the zone. A burial area reserved for large disposal items, such as cement walls from building demolition and empty fuel oil tanks, extends for 100 yards from the east side of Zone A.

Zone B is the burial site for over 5,000 herbicide waste drums from Rhodia (Rhone-Poulenc) Chemical Company, Portland, Oregon. The majority of drums contained 2,4-D Bleed, 2,4-DCP Tar, and MCPA waste. The composition of these materials is itemized in Table 3.2.

TABLE 3.1
WASTE QUANTITIES AND BURIAL LOCATION (3)

Location	Dimensions Lining	Waste Types	Estimated Quantity	Units
Zone A	250' x 150'	Acids	544	drums
		Aromatic Tars	160-248	drums
	bottom unlined	Carcinogenics (unspecified)	9	drums
	top lined	Caustics	8,774	drums
		Cadmium	11	drums
		Metal Finishing	244-304	drums
		Oil Sludge	433	drums
		Paint	10,258-24,200	drums
		Pesticides	425	drums
		Pesticide Containers (empty)	791-863	drums
Zone B	85' x 85'	2,4-D Manufacturing	2,011-5,080	drums
	bottom unlined top lined			
Zone C	110' x 110'	Acids	7,000	drums
		Acid Metal Cleaning	2,301,560	pounds
	bottom unlined	Lime Phenol	684,967	gallons
	top lined	Metal Cleaning	185,162	gallons
		Metal Finishing	17,000-35,724	gallons
		Metal Finishing	1,460,602-1,949,652	pounds
Zone D	105' x 105'	Aromatic Tar	499,270	pounds
		Cutting Oil	76,350-84,300	gallons
	bottom unlined	Fertilizer Manufacturing	228,288	pounds
	top lined	Oily Sludge	6,000-66,340	gallons
		Paint	72,475-497,418	pounds
		Paint	66,516-95,711	gallons
		Plywood Resin	1,393,380-2,215,440	pounds
		Solvents	12,648	gallons
Zone E	180' x 180'	Chlor-Alkali Sludge	10,500-11,582	Tons
	bottom and top lined			
Unknown		Acid Sludges	1,000	gallons
		Acid Wash Solution	312,350	pounds
		Benzoic Acid and Tar	176,000	pounds
		Chemistry Lab Reagents	1	drum
		Chrome Rinse Water	700,901	pounds
		DCP Tar	8,790	gallons
		Etching Solution	1,914	barrels
		Lime Sludge	80-160	drums
		MCPA Bleed	104,318-327,000	gallons
		MCPA Tar	2,965-3,037	drums
			939	drums
			2,813	barrels
			680	pails
		Metal Casing Wastes	3,300-5,760	drums
		Misc. Lab Chemicals	29	small containers
		NH_4+ and NaOH Chemical Solutions	17,238	gallons
		Oily Sludge	116,680	pounds
		Miscellaneous	435	drums
		Pesticide Containers	1,045	each
		Resin Manufacturing	392,553	gallons
		Solid Caustic Soda	44,550	pounds
		Wood Treatment/Preservative Sludges	238 294,662	drums plus gallons

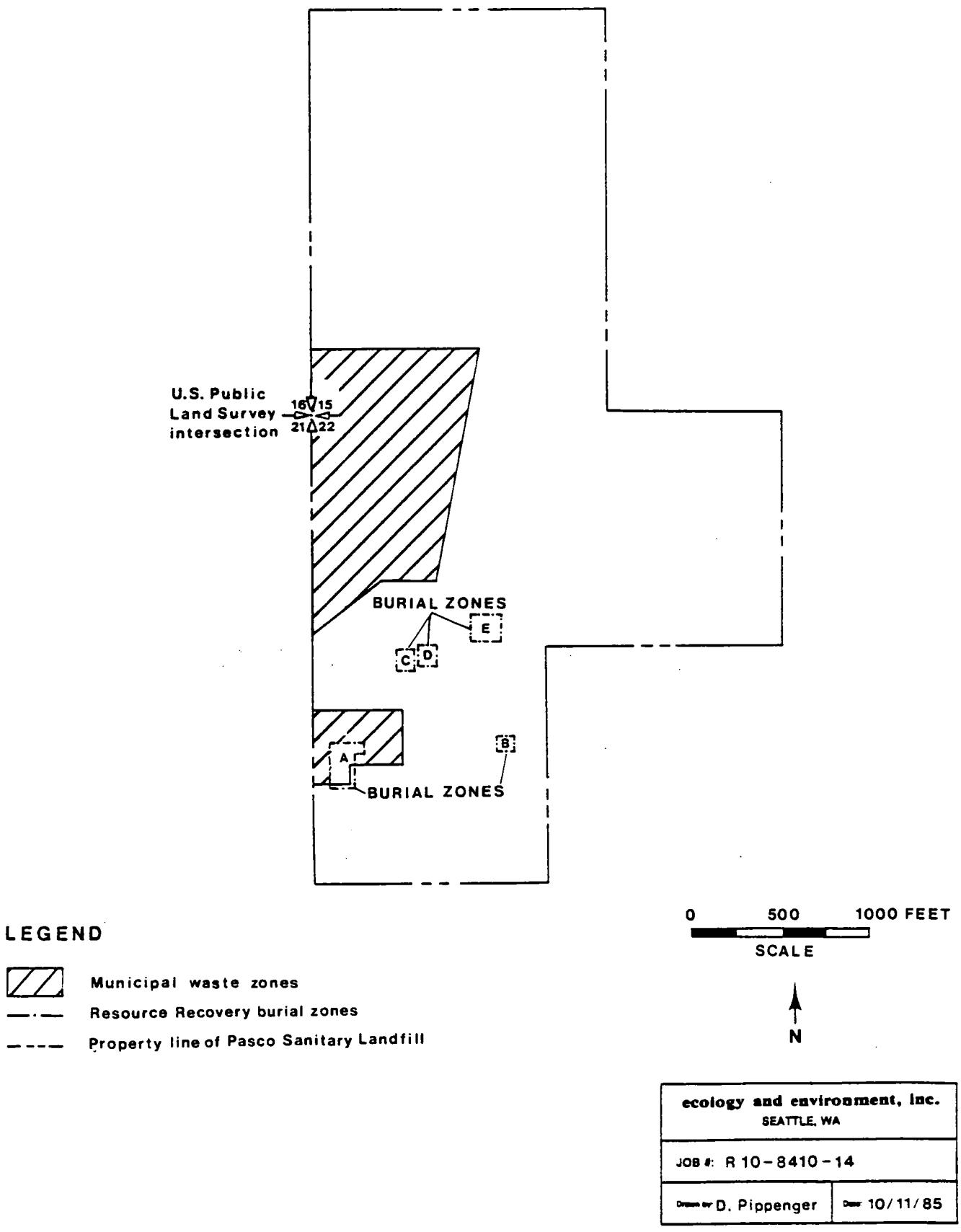


Figure 3.3 Site map of Resource Recovery burial zones, Pasco, Washington.

TABLE 3.2
COMPOSITIONS OF SOLID WASTES FROM
PRODUCTION OF RHODIA HERBICIDES (8)

Waste Name	Composition	%
2,4-D Bleed	2,4-D (as sodium salt), chlorophenols, tars	40 20 40
2,4-DCP Tar	2,4,6-trichlorophenols dichlorophenols para-chlorophenol tars	20-30 25-35 0- 5 35-45
MCP Tar	MCPA acids (as sodium salts) chlorinated cresols and other organics caustic sodium chloride	30 40 15 5

Drums were reportedly stacked at least three tiers high in this zone. However, newspaper photographs show drums stacked four high. Zone B was created by digging into the south side of a small plateau. The earthen surface above this zone is on the same level as the land to the north. Ground level south of the zone is at the same level as the base of the stacked drums.

Records provide conflicting information regarding the area covered by adjoining Zones C and D. Certain records indicate three zones existed in this area. According to Mr. L. Dietrich, only two liquid waste ponds were used. Zone C was an unlined pond used for evaporation of water from lime sludge, ammonia water, metal cleaning acids, and chrome plating wastes. Zone D is listed as an unlined pond used to hold liquid paint, oil, solvent, plywood resin, aromatic tar, pesticide, and fertilizer wastes.

Zone E was a lined chlor-alkali evaporative sludge pond that received approximately 12,000 tons of mercury-contaminated magnesia and barium sulfate liquors. The aqueous component of these wastes was removed by evaporation. No other kinds of wastes or waste materials were added to this pond.

Unsubstantiated reports claim that unsealed and leaking drums were received for disposal by RRC from Rhodia. However, Mr. L. Dietrich has stated that Rhodia drums were all new and in excellent condition.

On closure of the site in 1974, all zones were covered with three feet of soil, four mil polyethylene sheeting, and capped with an additional two feet of soil (9).

4.0 ENVIRONMENTAL CHARACTERISTICS

4.1 Physical Setting

RRC's hazardous waste disposal site is located in a sparsely populated rural area. Approximately 35 people live within a one-mile radius of the site. Pasco Sanitary Landfill covers 250 acres. The surface areas of the five burial zones shown in Figure 3.3 are listed below (10):

Zone	Area
Zone A	36,510 sq. ft. (0.84 acres)
Zone B	6,962 sq. ft. (0.16 acres)
Zone C	11,758 sq. ft. (0.27 acres)
Zone D	10,674 sq. ft. (0.25 acres)
Zone E	32,050 sq. ft. (0.74 acres)

The landfill is surrounded by irrigated agricultural fields and range land. Eighteen wells pump water for irrigation within a one-mile radius.

4.2 Meterology

The Cascade Mountains west of the Kennewick-Pasco-Richland (Tri-Cities) area obstruct the easterly flow of ocean-moistened air. The Rocky Mountains and ranges in southern British Columbia effectively block severe winter storms which move southward across Canada. The result is that the Tri-Cities area has a very dry climate with mild winters and hot summers (11).

The mean annual precipitation is 6.73 inches with an annual range of 4.05 to 12.90 inches. Maximum precipitation in a 24-hour period was 1.91 inches, recorded in 1957.

The Tri-Cities area has a mean annual snowfall of 14.0 inches, which falls mostly in January. Snowfall in measurable amounts can be expected from November to March.

Evaporation potential is approximately 60 inches per year with 80% of all evaporation occurring from May to October. Temperature extremes range from winter lows of -27°F to summer highs of 115°F. Normal westerly air patterns produce mean winter low temperatures of 22°F and mean summer high temperatures of 92°F. There are 56 days per year with a maximum temperature greater than 90°F and 117 days per year with a minimum temperature less than 32°F.

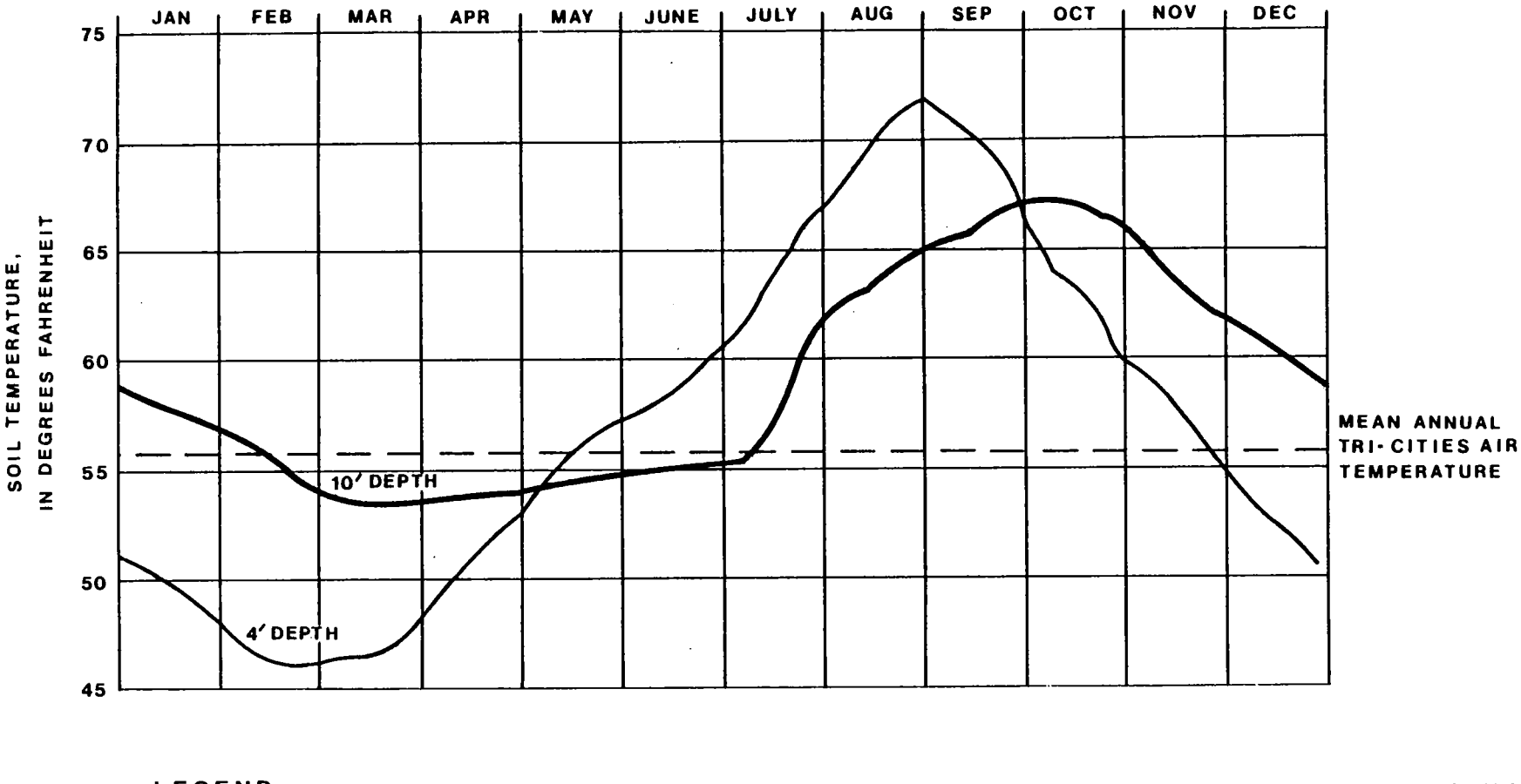
Subsurface soil temperatures have been measured at the landfill (7) and are shown in Figure 4.1. Mean winter relative humidity ranges from 58-80% as compared to the summer mean relative humidity of 31-59%.

Winds are predominately from the west-northwest in summer months with a mean windspeed range of 7.5-9.0 mph, and from the northwest in the winter months with a mean windspeed range of 6.0-7.0 mph. Gusts from the southwest and south-southwest of over 70 mph have been recorded, with little variance between summer and winter maximum wind speeds.

4.3 Regional Geology

Well logs and past geological studies have provided information on the regional shallow geology (7, 12, 13, 14). Soils and sediments beneath the Tri-Cities area vary in composition and origin to include: Eolian (wind transported) silts, and lacustrine deposits of silts and clays. These deposits form multiple layers having variable degrees of compaction, cementation, and constituent sizes. Depths to which these deposits extend is unknown.

Underlying these sediments is the Yakima Basalt Formation. It consists of numerous lava flows ranging from a few feet to over 200 feet in



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Measured soil temperature at 10 feet below ground surface

Measured soil temperature at 4 feet below ground surface

NOTE: Highest summer air temperature was 110° F.

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Figure 4.1 One-year soil temperature test (1971-1972), Resource Recovery Corporation, Pasco, Washington, adapted from DOE files (7).

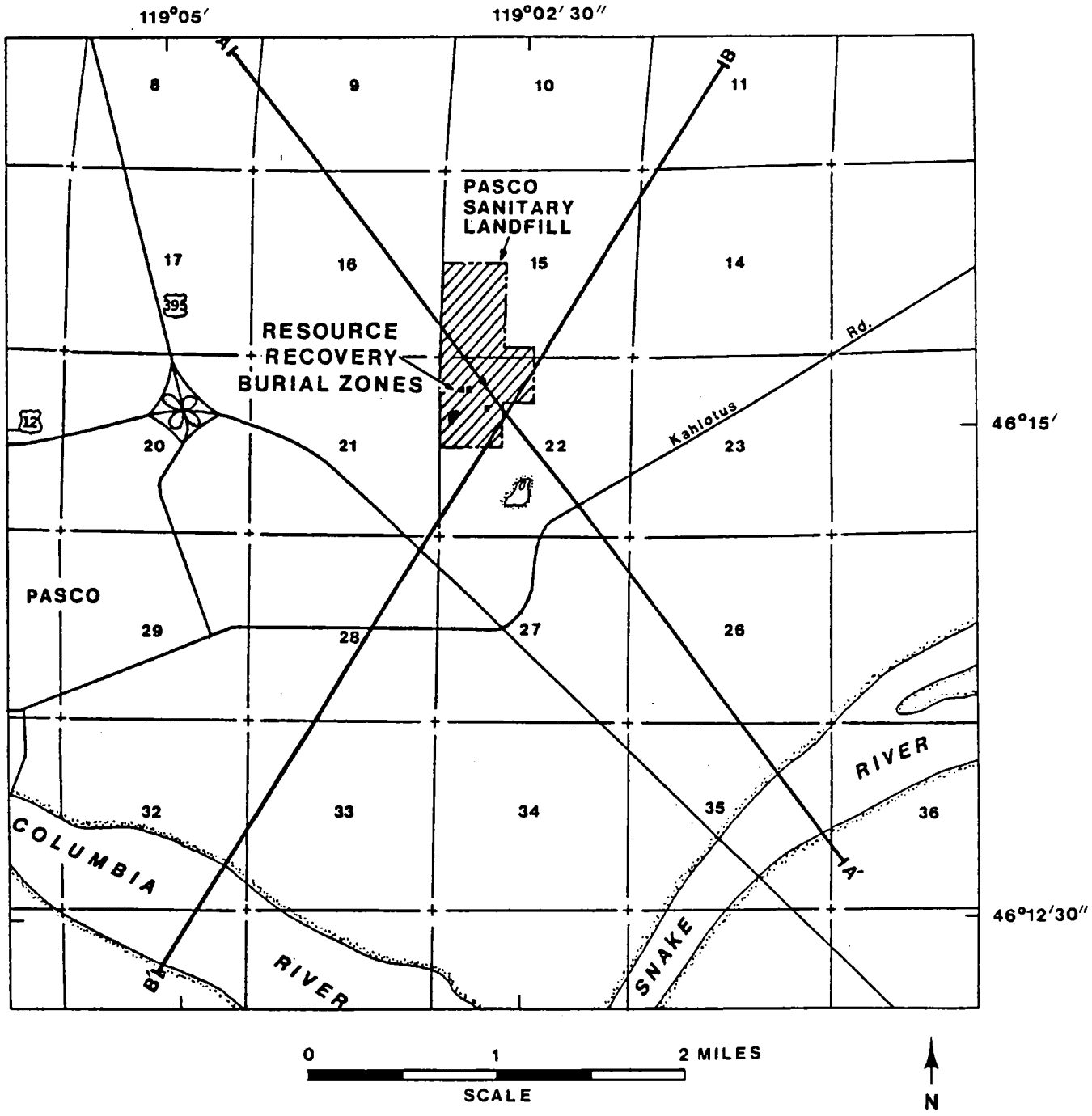
thickness. It is not certain what formations underly the Yakima Basalt in this area. Table 4.1 presents a generalized summary of the regional geologic units.

TABLE 4.1
DESCRIPTION OF GEOLOGIC UNITS

Geologic Unit Sub-Unit	Depth (feet)	Description	Permeability (cm/sec)
Eolian Sand & Silt	Surface	Light brown. Very fine sands & silts.	10^{-3}-10^{-5}
Touchet Formation	0- 40	Light to medium brown. Very fine to medium grained sands. Occasionally slightly to very silty.	10^{-3}-10^{-5}
Pasco Gravels	40- 60	Dark grey. Locally fine to coarse grained sands with occasional gravel	Greater than 10^{-3}
Ringold Formation Ringold Sands	60-100	Dark grey. Medium to coarse grain with gravel. Gravel increasing and getting coarser with depth.	Greater than 10^{-3}
Ringold Gravels	100-110	Tan gravel with sand.	Greater than 10^{-3}
Ringold Clays	110-140	Blue Clay.	Greater than 10^{-3}
Yakima Basalt	140+	Basalt	10^{-2}-10^{-5}

Figure 4.2 shows the geologic cross-section locations and Figure 4.3 the corresponding cross-sections from the RRC disposal area (7).

The surficial soils (approximately 0-5 feet in depth) of the PSL fall into three major categories: Sagehill very fine sandy loam, Kennewick silt loam, and Quincy loamy fine sand.



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A — A′ Location and name of geologic cross-section

12 U.S. Route

15 U.S. Public Land Survey section number

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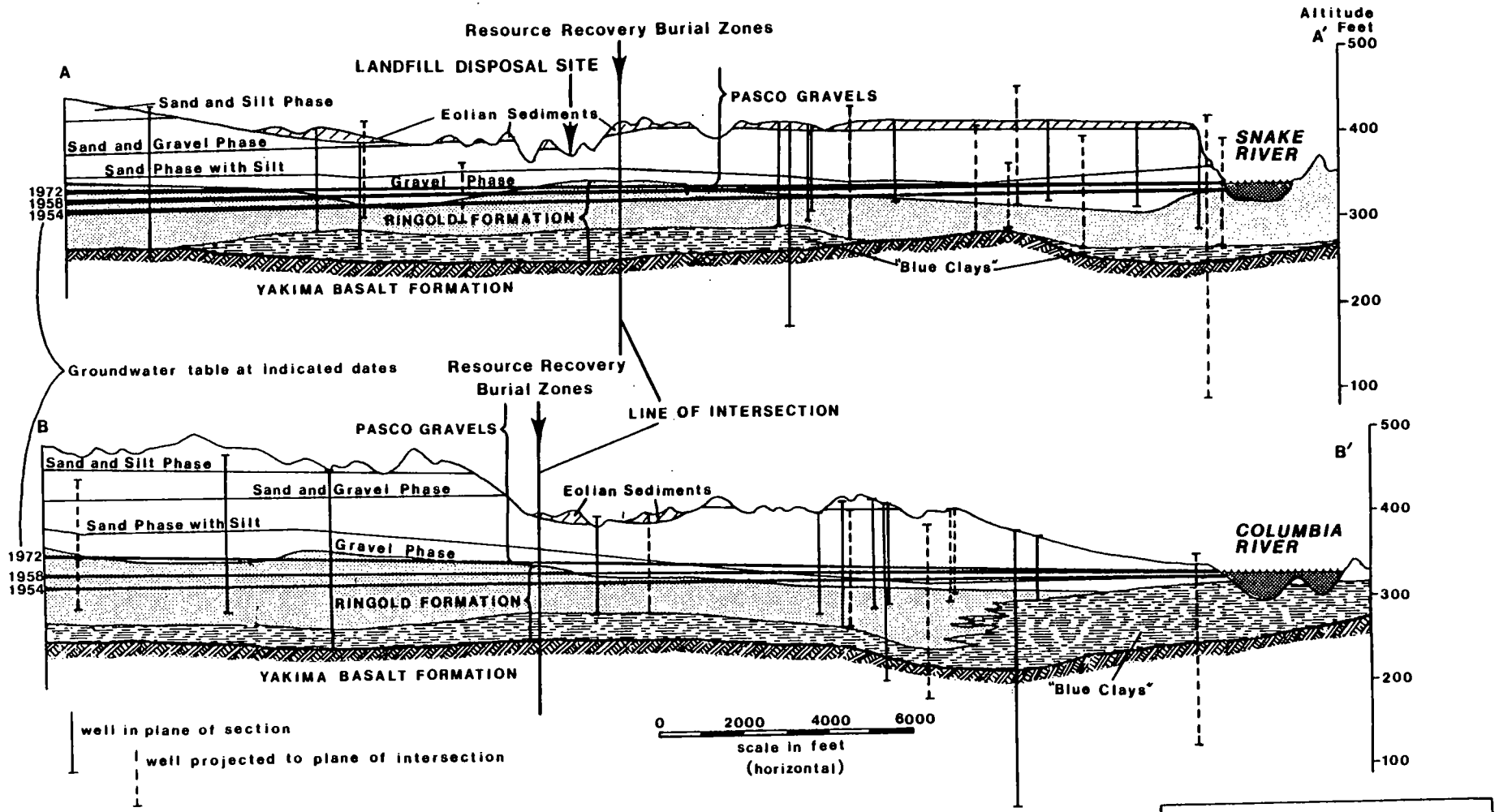
Figure 4.2 Locations of geologic cross-sections A-A' and B-B', Resource Recovery Corporation vicinity, Pasco, Washington, from DOE files on Pasco Sanitary Landfill (7).



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Drawn by: D. Pippenger	Date: 10/21/85

Figure 4.3 Geologic cross-sections A-A' and B-B' in the vicinity of Resource Recovery study area (adapted from DOE files on Pasco Sanitary Landfill). (7)

Sagehill and Kennewick soils are known to have slow to moderate permeabilities and high water capacity. The potential for water and wind erosion of this soil is moderate.

Quincy soil has a high water permeability and low water capacity. This soil type has only a slight risk of water erosion, but potential for wind erosion is severe.

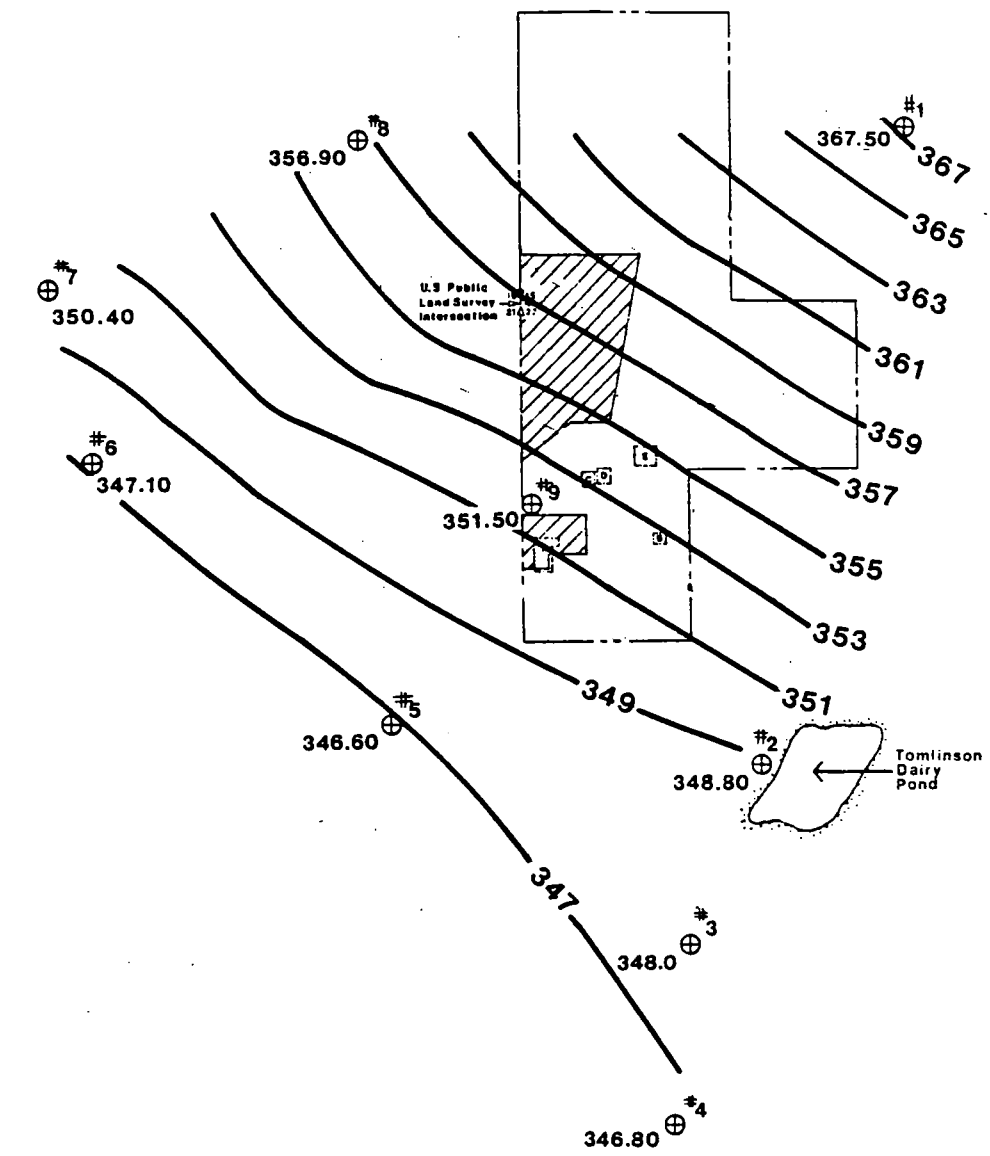
No data on the organic carbon concentration of these surface and subsurface soils at the site is available; in general these types of soils have low organic carbon content.

4.4 Hydrogeology

Ground water flow was estimated in a 1981 study by JUB Engineers, Inc., 2810 W. Clearwater Ave., Kennewick, WA (15), utilizing nine irrigation wells ranging from 1,000 to 5,600 feet from the center of the landfill (Figure 4.4). Wells were sampled April 24 and 25, 1981. Ground water flows were to the southwest with a gradient of 3.7 feet per 1,000 feet.

Subsequent testing of wells installed by JUB Engineers, Inc. specifically for monitoring the PSL site confirm that this flow pattern was unchanged through a period of quarterly and then annual sampling episodes as illustrated in Figure 4.5. Well casings were constructed of two-inch PVC pipe with screw joints below the water table and glued joints above. Bentonite seals were placed just above the water table, at twenty feet below grade, and at the surface. Two screens were set in each well. JUB well construction details are presented in a JUB summary report (14).

Depth to ground water below land surface of the wells constructed by JUB is shown in Table 4.2.



0 1000 2000 FEET

N

LEGEND

- Municipal waste disposal zones
- C — Location and name of Resource Recovery burial zone
- ---- Boundary of Pasco Sanitary Landfill
- -351- Contour showing ground water elevation, in feet AMSL
- 346.6 — Elevation of ground water at monitoring well, in feet AMSL
- #4 — Location and number of existing monitoring well

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Figure 4.4 Contour map showing elevation of ground water, in feet AMSL, at Resource Recovery study area, on April 24-25, 1981, adapted from JUB report (15).

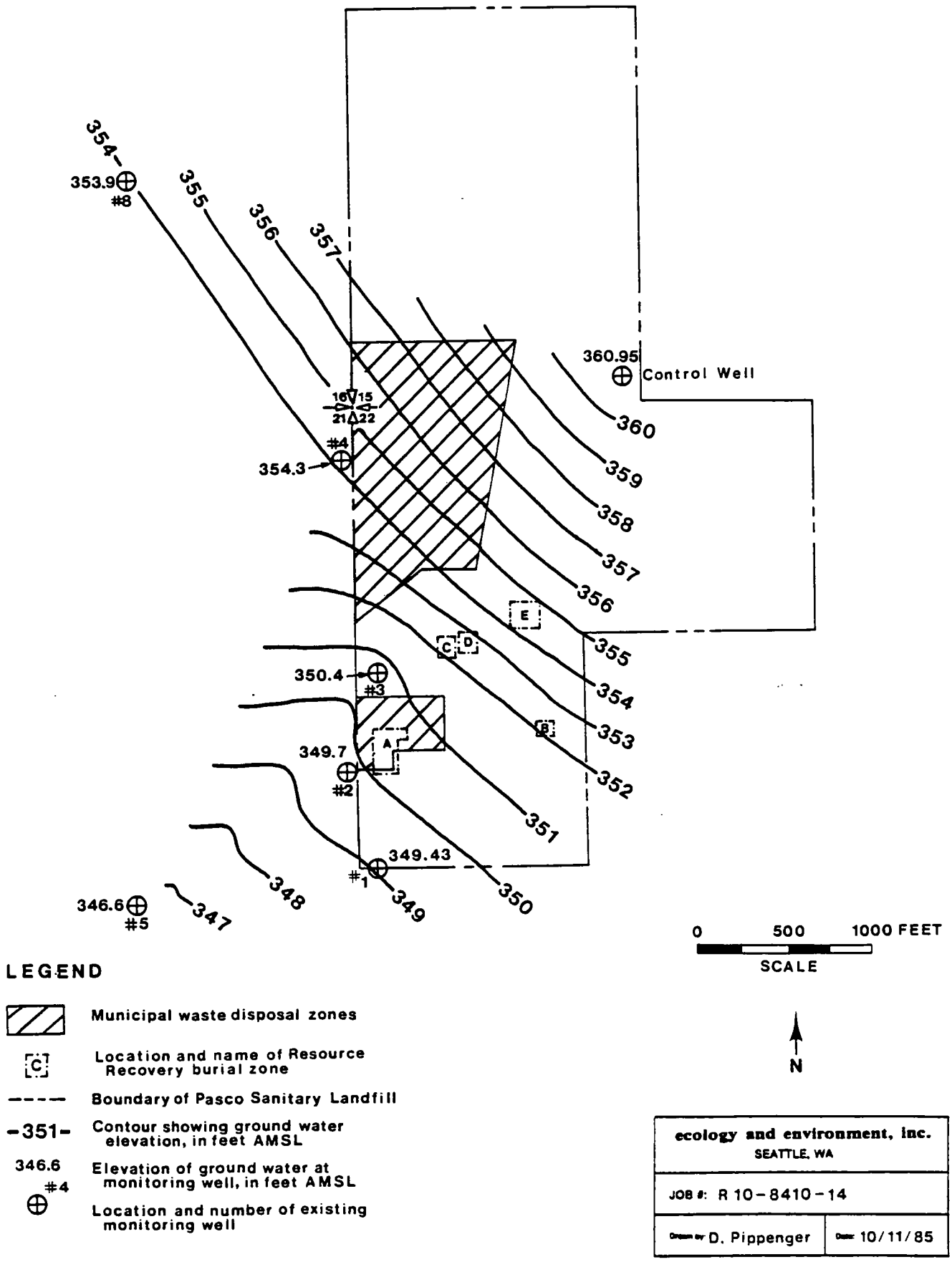


Figure 4.5 Contour map showing elevation (in feet AMSL) of ground water for December 29-30, 1982, adapted from JUB report (14).

TABLE 4.2
GROUND WATER LEVELS
DECEMBER 1982

Well Number	Depth Below Surface (feet)	Surface Elevation (AMSL)*	Ground Water Elevation (AMSL)
JUB 1	64.5	413.9	349.43
JUB 2	56.5	406.2	349.70
JUB 3	68.7	419.1	350.4
JUB 4	38.5	392.75	354.30
JUB Control	49	410.1	360.95

*AMSL - Above Mean Sea Level

A ground water mound may exist 1,500 feet to the southeast of the site to form the Tomlinson Dairy Pond. Existing wells do not provide sufficient information to estimate the effect of this ground water mound on the direction of flow south of the site.

There are fifteen water and power resource service monitoring wells withing a four mile radius of the site, however, none are downgradient of the site.

Currently, eighteen operational irrigation circles exist within a one mile radius of the PSL which rely on ground water for water supply. Irrigation has had and will continue to have a significant impact on the hydrogeology in this area. Between 1950 and 1974-5 the water table in this area rose approximately ten feet but has dropped about five feet since 1975. Projected irrigation demands have been incorporated into models, the results of which predict a continuing drop in ground water elevation through the year 2000 (15).

4.5 Surface Water

There is no surface water on or adjacent to the Pasco Sanitary Landfill (PSL). The topography of the site could lead to some localized drainage patterns, but the high permeability and climatic conditions of the area sustain vertical drainage patterns.

A dairy pond, approximately 2,000 feet south-southwest of the disposal area, and the Snake and Columbia Rivers, each approximately 15,000 feet southeast and southwest, respectively, of the disposal zones are the surface water bodies closest to the site.

4.6 Demography

RRC is situated in a sparsely populated section of Franklin County. According to 1980 U.S. Census data, approximatey 1,900 people reside within one mile of the site, 6,300 people within two miles and 16,000 within four miles.

Approximately twelve domestic and commercial wells, and eighteen irrigation wells exist within a one mile radius of the site. The total population served by the domestic wells is estimated to be 100 people. The closest major population center is the City of Pasco, approximately 1.5 miles southwest of the site. The primary water supply for Pasco residents is the Columbia River. The single most important natural resource in the site vicinity is agricultural land.

4.7 Aerial Photography

Aerial photographs of the RRC site were examined to identify historic areas of activity. Three black and white photographs were obtained from the EPA.

Date	Approximate Scale
August 3, 1970	1" = 250'
May 11, 1973	1" = 335'
April 12, 1978	1" = 185'

Photographic evidence indicates no activity in burial zone areas prior to 1970. Activity is indicated in all zones in the 1973 photo except for identification of only one liquid waste pond at Zone CD. The 1978 photo shows no active RRC burial zones, but indicates ground scarring and fill over each. Photographs are presented in Appendix A.

5.0 FIELD INVESTIGATION

5.1 Introduction

Tasks 1 and 2 were completed with the preparation of the Proposed Sampling Plan for the RRC FI in June 1985 (16). Task 3 consisted of on-site field work required to define the nature and extent of environmental contamination adjacent to known hazardous waste burial zones. Task 4 consisted of collection and review of data gathered during Task 3 and interpretation of these results, integration with historical data and discussion of the environmental fate of contaminants encountered. Task 5 is complete with publication of this report.

5.2 Detailed Site Investigation

Field work began on July 10, 1985 and proceeded through August 8, 1985 and was designed to establish a data base of sufficient quantity and quality to permit detailed evaluation of contaminant dispersal or leaching from burial zones. A series of subtasks were completed during E&E's activities at the site.

5.2.1 Surveying/Ground Water Elevation Verification

Existing monitoring wells were resurveyed using a Pentax theodolite and surveyor's chain to verify locations and elevations. Burial zones were also resurveyed, repeating a 1980 survey by A.D. Stanley and Associates of Pasco, Washington (commissioned by Resource Recovery Corporation) to detail burial zone locations. Ground water levels in the five existing monitoring wells and water supply well (WSW) were measured and plotted (Figure 5.1). This data was used to verify the ground water contours from other investigators. New E&E monitoring well locations, on the downgradient perimenters of each burial zone, were based on results of the E&E survey. An upgradient background well location was also established.

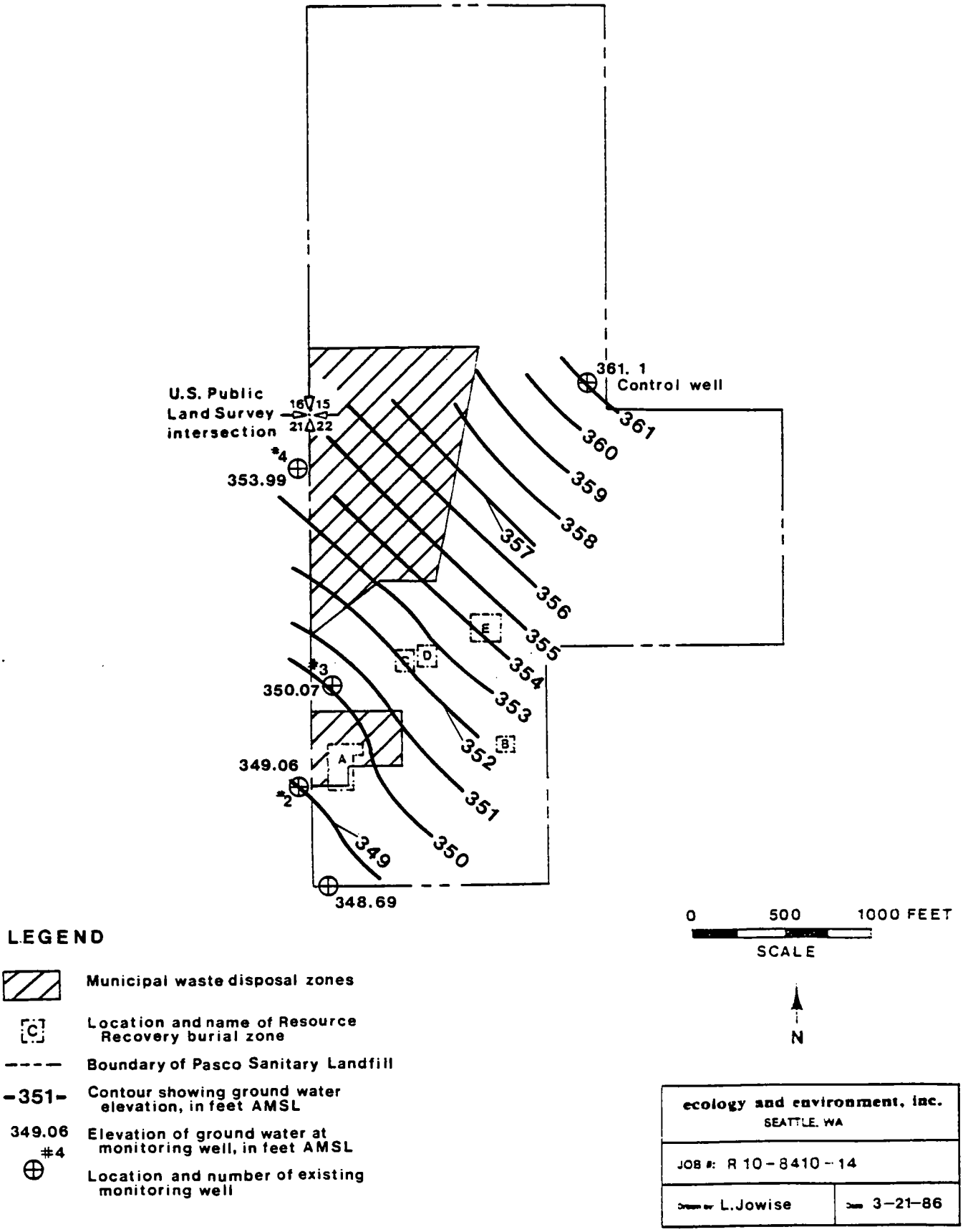


Figure 5.1 Contour map showing elevation of ground water, in feet AMSL, at Resource Recovery study area on July 9-10, 1985.

5.2.2 Well Drilling and Installation

The objectives of this sub-task were to: 1) provide a detailed chemical description of the subsurface geological and ground water environment downgradient of each burial zone; and 2) evaluate the magnitude of chemical contamination from each burial zone. Nine monitoring wells were installed to achieve these objectives (Figure 5.2). Monitoring wells 2 through 9 were positioned within 25 feet of surveyed burial zone perimeters. Monitoring well 1 (background) was located 420 feet southeast of the JUB control well and 1,250 northeast of the closest RRC burial zone.

5.2.2.1 Soil Boring and Soil Sample Collection

Each boring was advanced to at least 22 feet below the ground water table using a six-inch inside diameter hollow stem auger fitted with a center plug. The on-site geologist used drill cuttings to classifly the lithologic characteristics of the subsurface soil according to the U.S. Soils Classification System. Drilling and sample logs are presented in Appendix B. Drill cuttings were collected in clean 55-gallon drums and stored on-site for later disposal.

As each boring was advanced, a clean stainless steel spatula was used to collect approximately four ounces of soil from the auger flights per linear foot of drilling. A continuous sample was collected from each ten foot section of drilling. Each ten-foot continuous sample was homogenized and stored on ice in coolers until all samples designated for a composite were collected. Sample compositing was designed to provide soil data at depths corresponding to burial depths and at depths from below the maximum burial depth to the maximum depth of the vadose (unsaturated) zone.

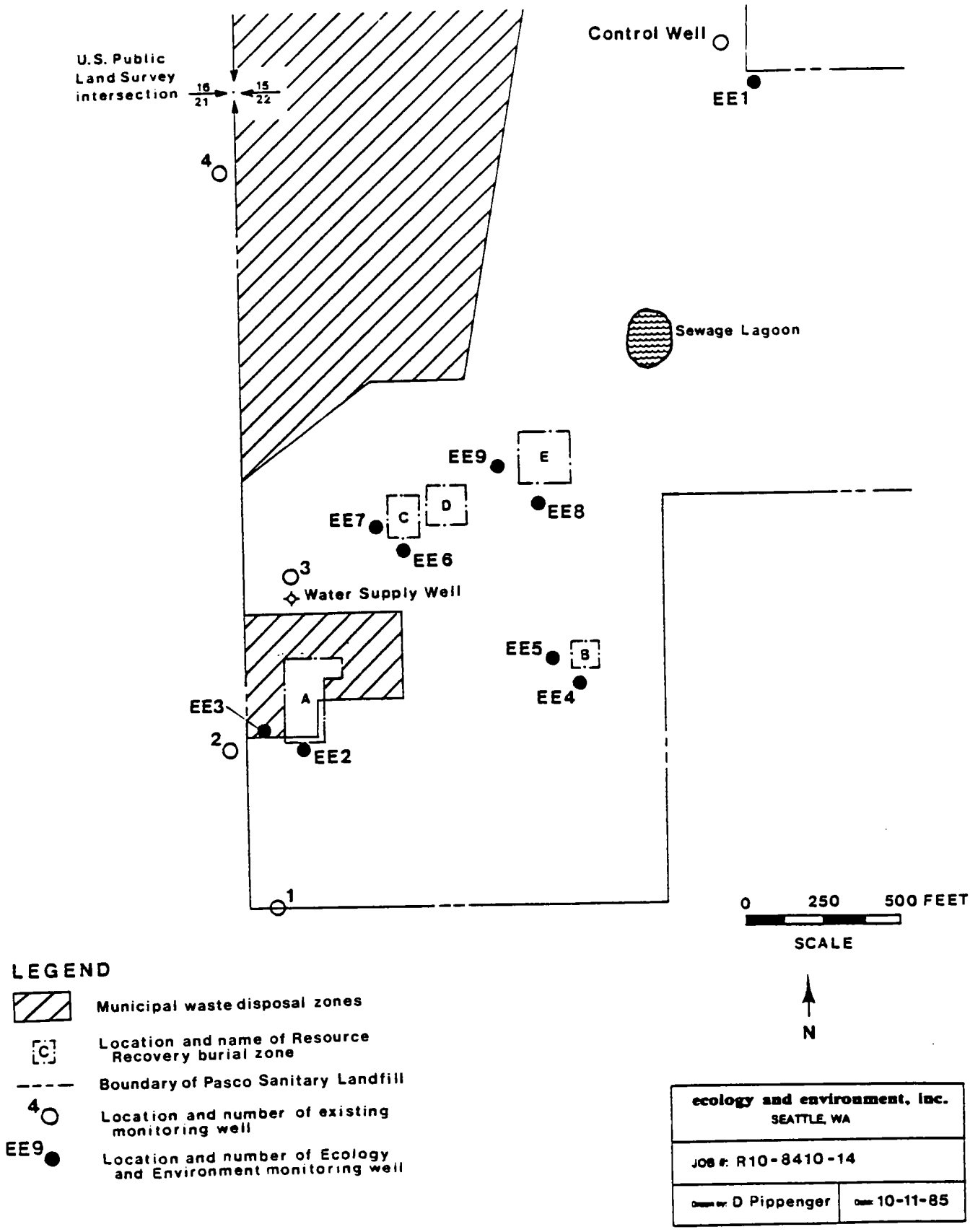


Figure 5.2 Monitoring well locations at Resource Recovery site, Pasco, Washington.

Soil compositing is detailed in Table 5.1. Surface soils were not collected in order to avoid interference from wind dispersed sanitary landfill materials and crop spraying materials, and because waste burial practices were expected to prevent upward migration of contaminants.

TABLE 5.1
SUBSURFACE SOIL SAMPLE SUMMARY

Location	Well No.	Matrix	Type	Depth Below Grade
Background	EE-1	Soil	Composite	10-30'
	EE-1	Soil	Composite	30-58'
Zone A	EE-2	Soil	Composite	10-30'
	EE-2	Soil	Composite	30-68'
	EE-3	Soil	Composite	10-30'
	EE-3	Soil	Composite	30-65'
Zone B	EE-4	Soil	Continuous	10-20'
	EE-4	Soil	Composite	20-43'
	EE-5	Soil	Continuous	10-20'
	EE-5	Soil	Composite	20-52'
Zone CD	EE-6	Soil	Composite	10-30'
	EE-6	Soil	Composite	30-70'
	EE-7	Soil	Composite	10-30'
	EE-7	Soil	Composite	30-73'
Zone E	EE-8	Soil	Composite	10-30'
	EE-8	Soil	Composite	30-77'
	EE-9	Soil	Composite	10-30'
	EE-9	Soil	Composite	30-73'

Composite samples were generated by adding equal volumes of soil from continuous samples to a stainless steel container and thoroughly homogenizing the mixture.

Augers and associated drilling and sampling tools were routinely decontaminated between borings to minimize cross-contamination. Routine decontamination included:

- o high pressure hot soap and water wash
- o high pressure hot water rinse
- o nanograde acetone rinse
- o nanograde methanol rinse
- o final rinse with deionized, carbon-free water

Samples and composites were submitted to assigned Contract Laboratory Program (CLP) labs for Inorganic and Organic analyses, and to the EPA Region X Laboratory for herbicide analysis. Details of soil sample documentation, packaging and shipping are summarized in Appendix C. Analytical requirements are summarized in Appendix D.

Quality Assurance reviews are presented in Appendix E. The QA reviews were performed by E&E senior chemists for those samples analyzed through the CLP and by EPA personnel for those samples analyzed at the EPA Region X Laboratory. The data were, in general, judged to be acceptable, except where flagged with qualifiers which modified the usefulness of individual values.

5.2.2.2 Well Installation and Ground Water Sampling

All nine E&E monitoring wells were constructed of two-inch inside diameter (I.D.) stainless steel casing with a twenty foot length of wire-wound stainless steel well screen having a slot size of 0.010 inches. Wells were set inside the hollow stem auger and the annular space was filled as the augers were withdrawn. The lower annular space of each well was backfilled with coarse sand to at least two feet above the screen. A fine-grained sand cap of one to three feet was placed over the coarse sand pack. The annular space from the sand cap to approximately ten feet below ground surface was pressure grouted from the bottom up with a bentonite

slurry. The remaining ten feet were sealed with cement grout. A six-inch outside diameter (O.D.) protective steel casing with locking cover set at least three feet into the cement and extending two feet above ground level was placed over each well for protection (Figure 5.3).

Well development was accomplished by purging and backflushing each well four times using approximately 15 gallons of well water each time. At the end of this process, the water was clear and free of sand. Well completion diagrams and construction details are presented in Appendix B.

After development, each well was allowed to equilibrate at least 24 hours prior to collection of a ground water sample. The static water level in each well was measured and four times the standing water volume was purged from each well. After appropriate purging, sample collection was accomplished with a clean stainless steel top loading bailer. pH, conductivity, and water temperature were measured at this time.

Existing JUB monitoring wells at the PSL were also purged and sampled in the same manner as the E&E wells. Development, purge, and decontamination waters were collected in clean 55-gallon drums and stored on-site for later disposal. Ground water sampling is summarized in Table 5.2. Figure 5.4 illustrates monitoring well screen and ground water depth measured below ground surface at the time of sample collection. Ground water elevations were measured December 20-21, 1985; ground water contours based on this sampling episode are shown in Figure 5.5.

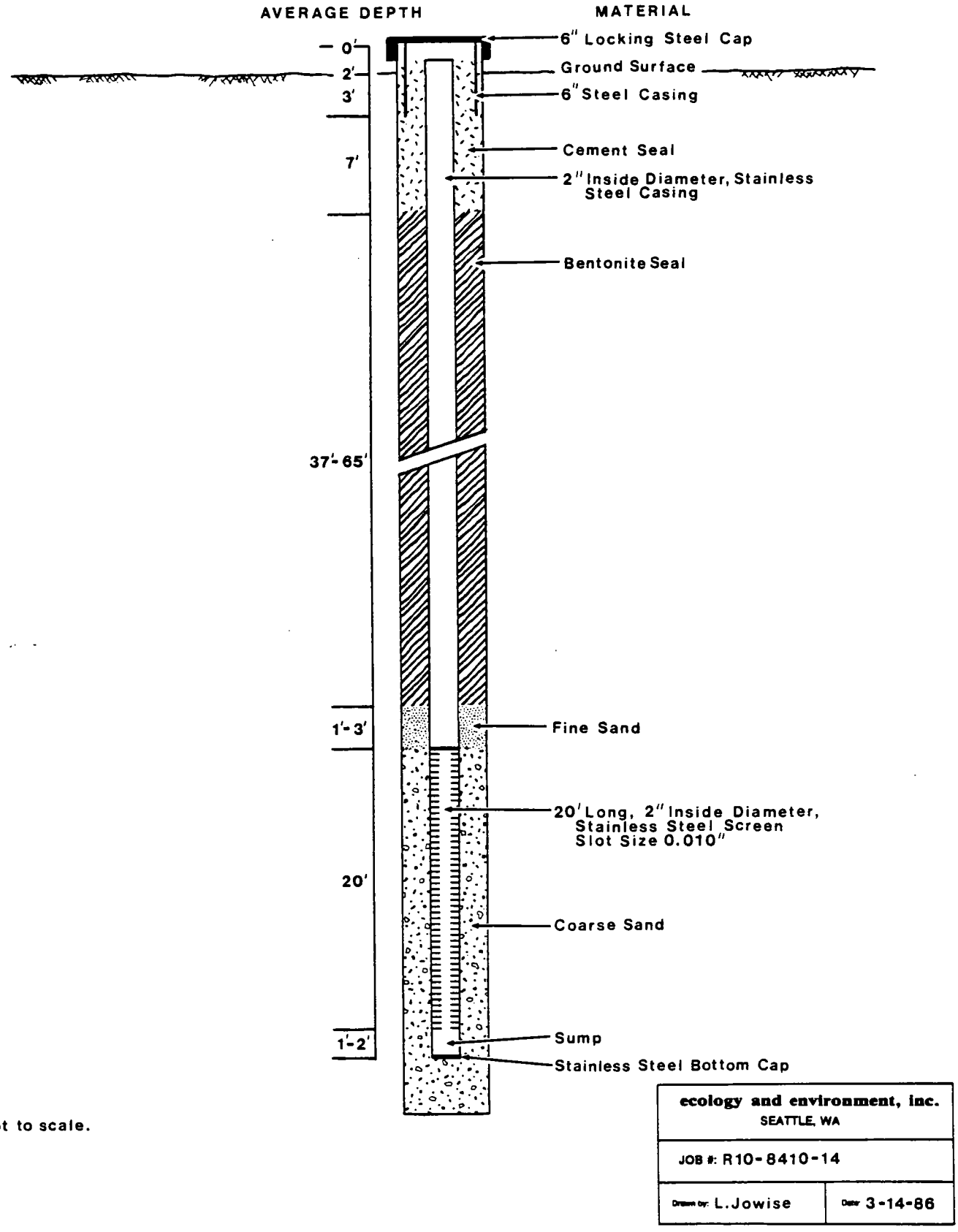


Figure 5.3 General well construction diagram of Ecology and Environment, Inc. monitoring wells at Resource Recovery study area, Pasco, Washington.

TABLE 5.2
GROUND WATER SAMPLE SUMMARY

Location	Well No.	Matrix	Type
Background	EE-1	Water	Grab
Zone A	EE-2	Water	Grab
	EE-3	Water	Grab
Zone B	EE-4	Water	Grab
	EE-5	Water	Grab
Zone CD	EE-6	Water	Grab
	EE-7	Water	Grab
Zone E	EE-8	Water	Grab
	EE-9	Water	Grab
PSL	JUB-1	Water	Grab
	JUB-2	Water	Grab
	JUB-3	Water	Grab
	JUB-4	Water	Grab
	JUB Control	Water	Grab
	WSW	Water	Grab

Aqueous samples were submitted to assigned CLP laboratories for Inorganic and Organic analyses, and to the EPA Region X Laboratory for herbicide analyses. Details of aqueous sample documentation, packaging and shipping are summarized in Appendix C. Analytical requirements are summarized in Appendix D.

Quality Assurance reviews are presented in Appendix E. The QA reviews were performed by E&E senior chemists for those samples analyzed through the CLP and by EPA personnel for those samples analyzed at the EPA Region X Laboratory. The data were, in general, judged to be acceptable, except where flagged with qualifiers which modified the usefulness of individual values.

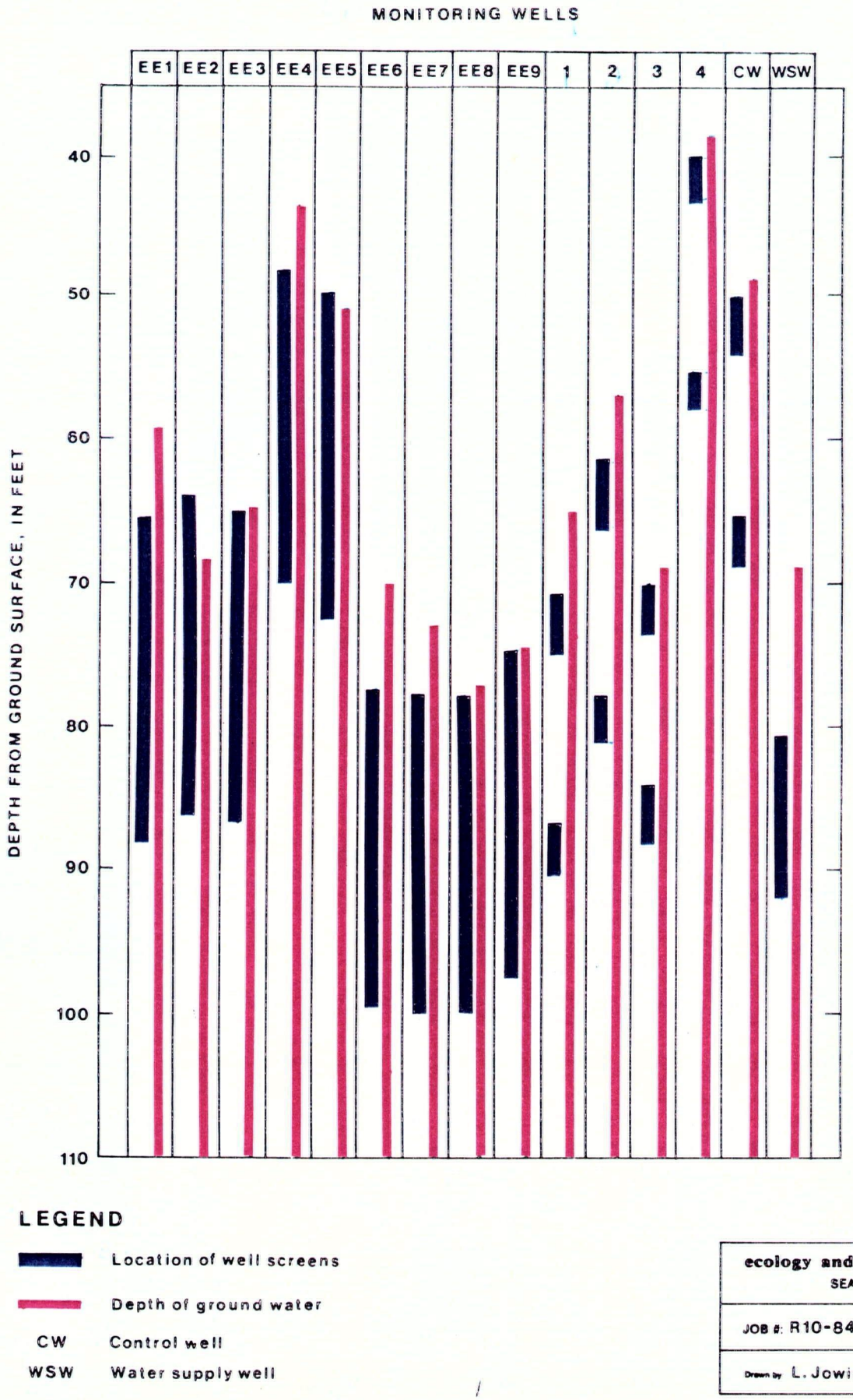
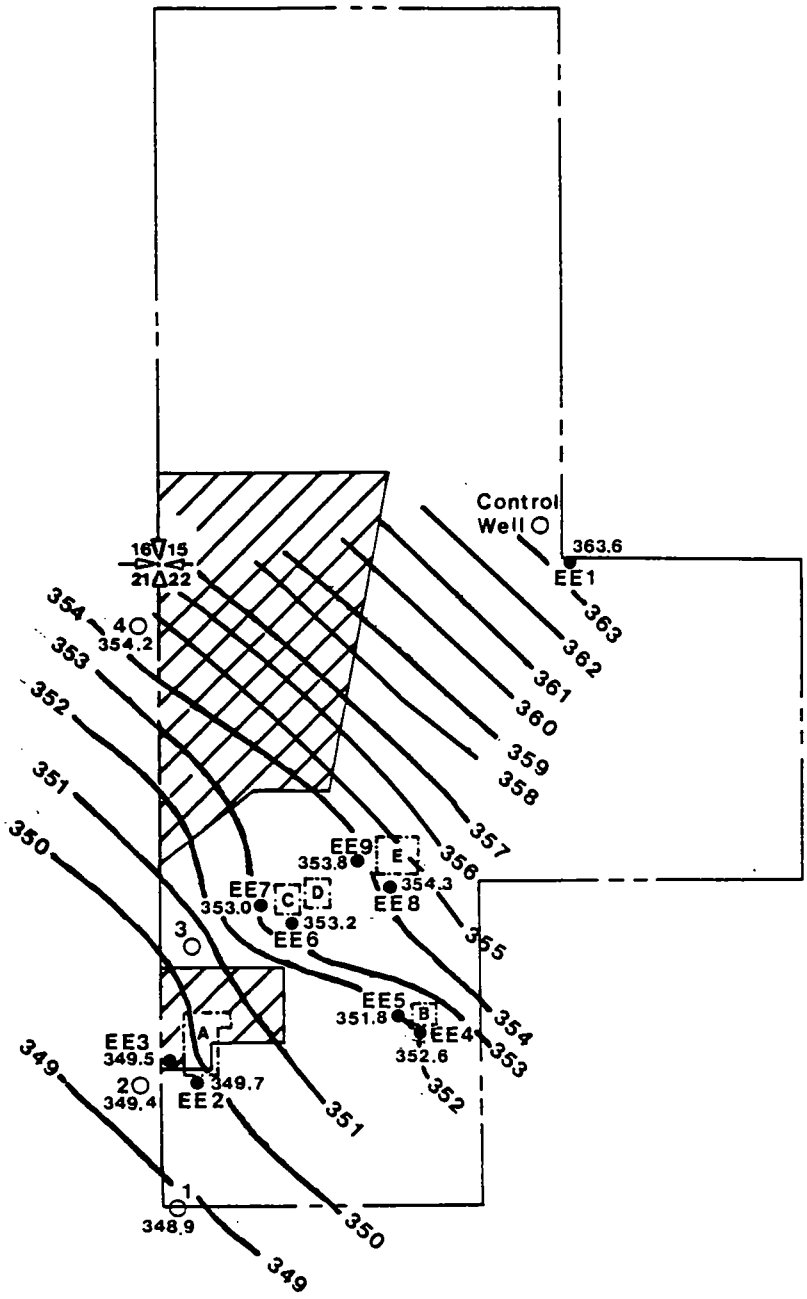


Figure 5.4 Monitoring well screen depths and ground water levels, July-August, 1985, Resource Recovery study area, Pasco, Washington.



LEGEND

- Municipal waste disposal zones
- [C] Location and name of Resource Recovery burial zone
- ---- Boundary of Pasco Sanitary Landfill
- 16 15 / 22 21 U.S. Public Land Survey intersection
- -356- Elevation of ground water level contours
- 354.2 Elevation of ground water at monitoring well, in feet AMSL
- ● EE3 Location and number of Ecology and Environment monitoring well
- ○ 4 Location and number of existing monitoring well

0 500 1000 FEET

SCALE

N

ecology and environment, inc. SEATTLE, WA	
JOB #: R10 - 8410 - 14	
Drawn by: D. Pippenger	Date: 10-16-85

Figure 5.5 Contour map showing elevation of ground water, in feet AMSL, at Resource Recovery study area on December 20-21, 1985.

6.0 RESULTS AND DISCUSSION

6.1 Introduction

Presentation and interpretation of the geological and chemical data generated during Task 3 was the goal of Task 4. The reduced data is presented and discussed in the following sections.

6.2 Subsurface Soil Lithology

The upper one to two feet of soils at the site are loamy to very fine-grained sandy soils. Wind erosion and excavation has removed all or part of this layer exposing the plastic liner in places. From zero to ten feet below ground surface are silty sands. This is followed by a fine- to coarse-grained sand unit at 25 to 55 feet below ground surface. The sand is composed of clear to frosted quartz grains and brown, possibly basaltic, grains. In places the sand is cemented into thin layers. Occurring below the sand unit to the bottom of each borehole are clean gravels to gravelly sands with interbedded, unconsolidated sands.

The three major lithological units described above are found at varying depths in each borehole, indicating lateral continuity of the units across the site. Ground water was encountered between 43 and 77 feet below ground surface (Figure 6.1). Subsurface lithologies are summarized in Figure 6.2.

6.3 Analytical Results For Soils

6.3.1 Subsurface Soil Gases

An HNU Model PI-101 was used for ambient air monitoring of organic vapors during drilling. Levels above background were encountered only at monitoring wells EE-2 and EE-3. Boring at EE-3 penetrated a strata of municipal trash which included: wood, aluminum cans, and plastic material between three and seventeen feet below ground surface. Readings of 500 ppm

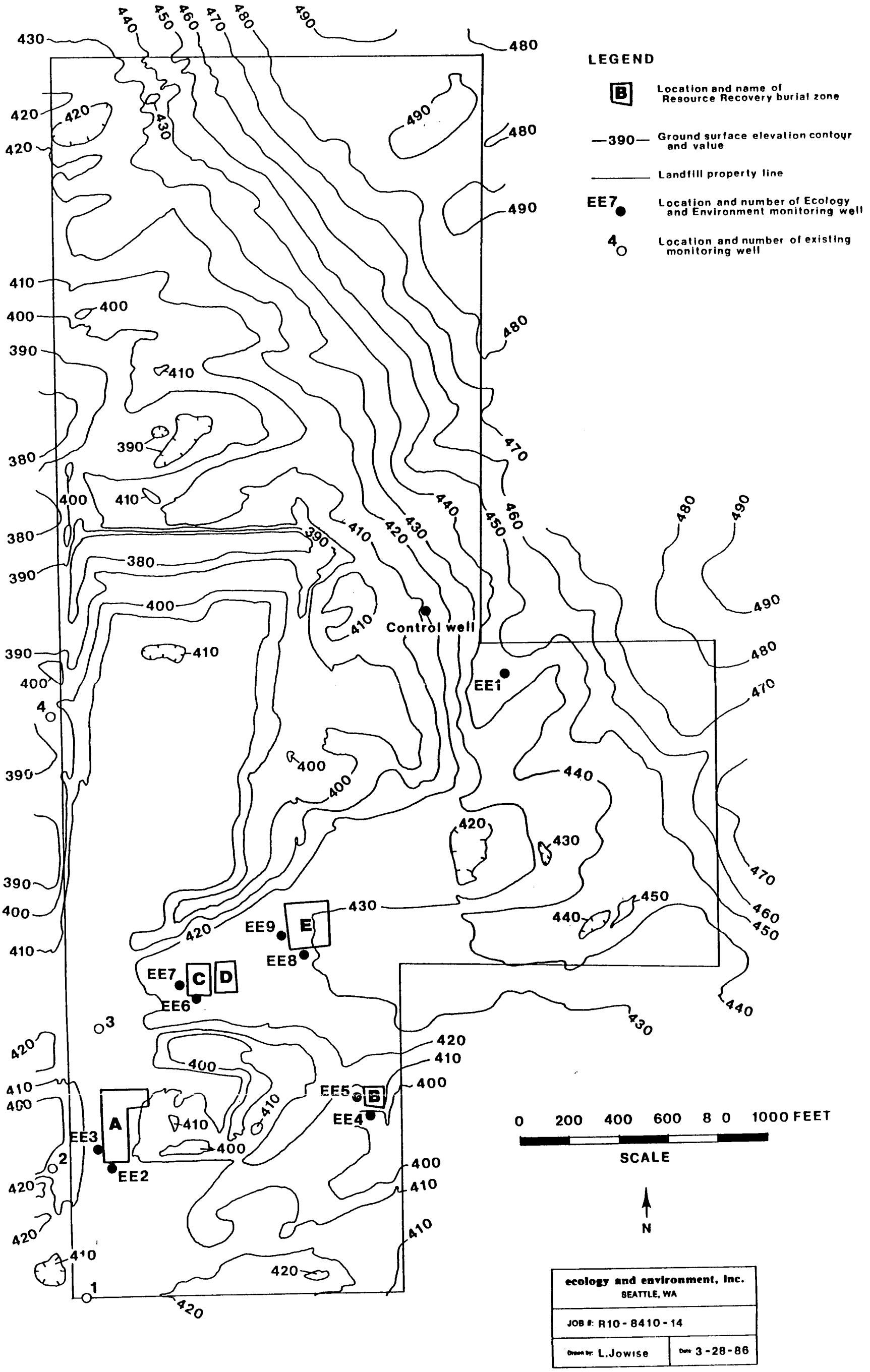


Figure 6.1 Contours showing ground surface elevations, in feet AMSL, at Resource Recovery study area, Pasco, Washington.

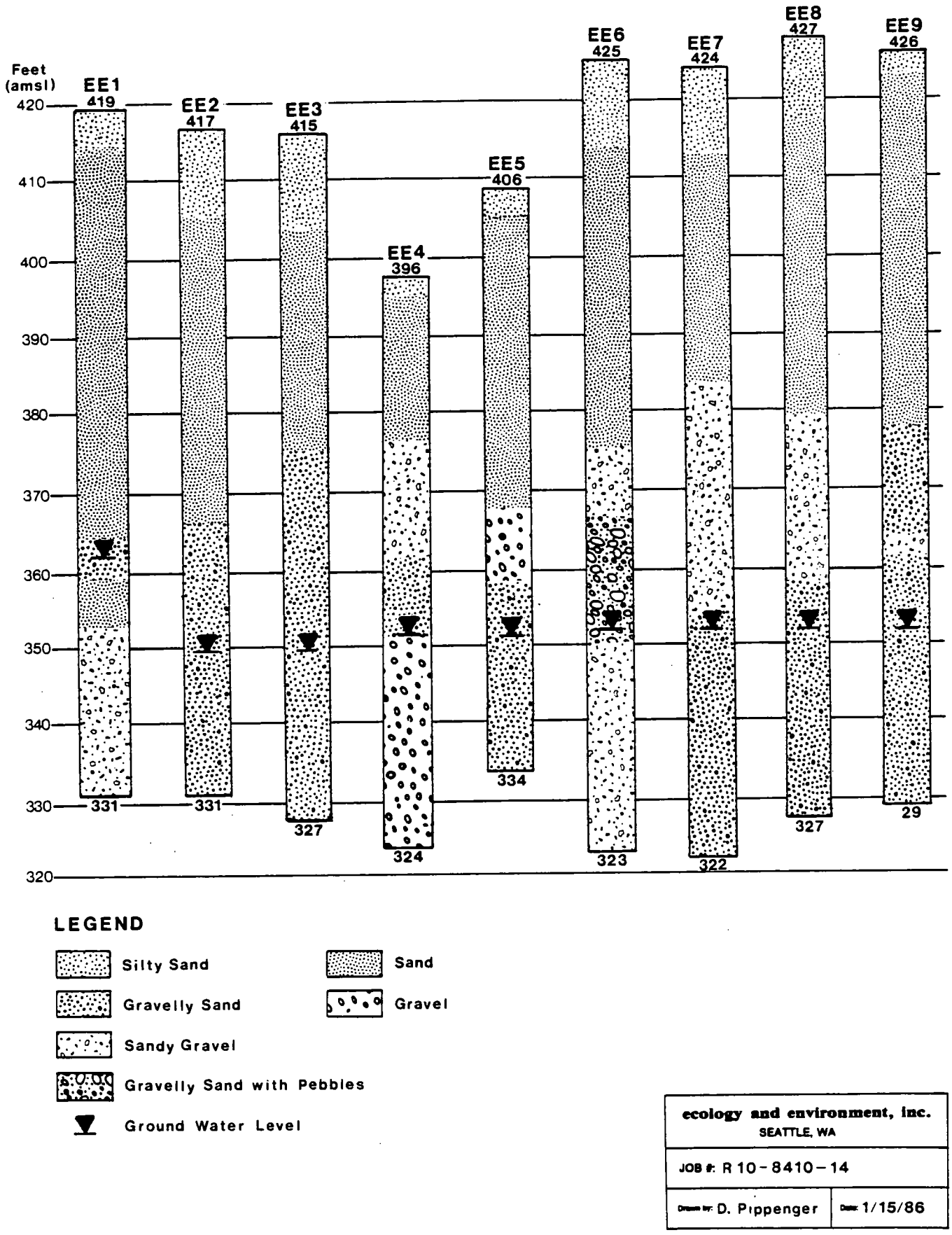


Figure 6.2 Comparison of lithology of monitoring wells at Resource Recovery study area, Pasco, Washington.

at the borehole exit were probably due to methane-like gases normally associated with decomposition of organic materials in landfills. The maximum reading at EE-2 was 7 ppm and probably resulted from migration of soil gases from the old municipal waste burial zone which surrounds Resource Recovery burial Zone A.

6.3.2 Subsurface Soil Volatile Organic Compounds

The combination of drilling techniques, ambient weather conditions, sample collection methodology, and subsurface lithology presented an unacceptably high probability of sample alteration, primarily through volatilization and loss of contaminants in the soil, prior to analysis by a laboratory. Therefore, no soil samples were submitted for volatile organic analysis.

6.3.3 Subsurface Soil Base/Neutral/Acid (BNA) Organic Compounds

Low levels of Benzo (a) pyrene were found in the shallow and deep soil samples at EE-7 and in the deep soil sample from EE-3. Phenol was found in the EE-3 deep soil sample. Several compounds were indentified in the shallow soil sample from EE3. No BNAs were detected in any of the other soil samples.

Table 6.1 is a summary of all BNA data where compounds were detected and identified. Data from all BNA soil analyses are presented in Appendix F.

Many of the compounds listed in Table 6.1 are polycyclic aromatic hydrocarbons (PAHs), the major components of creosote (17). Creosote is one of the materials reported to have been disposed of in the vicinity of Zone A prior to use of the area by Resource Recovery Corporation. Table 6.2 presents pure creosote component concentrations normalized to

TABLE 6.1
POSITIVELY IDENTIFIED BASE/NEUTRAL/ACID COMPOUNDS
IN SUBSURFACE SOILS
(ug/kg)

COMPOUNDS	Sample Number	EE-3 (10-30')	EE-3 (30'-GW)	EE-7 (10-30')	EE-7 (30'-GW)
PHENOL			1900J		
NAPHTHALENE		1700J			
2-METHYLNAPHTHALENE		1200J			
ACENAPHTHENE		370J			
DIBENZOFURAN		190J			
FLUORENE		270J			
PHENANTHRENE		1300J			
ANTHRACENE		200J			
DI-N-BUTYL PHTHALATE		2000J			
FLUORANTHENE		960J			
PYRENE		1400J			
BUTYL BENZYL PHTHALATE		430J			
BENZO (A) ANTHRACENE		320J			
CHRYSENE		220J			
DI-N-OCTYL PHTHALATE		1900J			
BENZO (A) PYRENE			150J	170J	160J

J = ESTIMATED CONCENTRATION (ANALYTICAL QUALITY CONTROL CRITERIA NOT COMPLETELY ACCEPTABLE)
GW = Ground Water

TABLE 6.2
COMPARISON OF CREOSOTE COMPOSITION RATIOS
TO SHALLOW SOIL DATA FROM EE-3

COMPOUND	IN CREOSOTE	EE3 10-30FT.
PHENOL	--	--
NAPHTHALENE	.14	.81
2-METHYLNAPHTHALENE	.06	.57
ACENAPHTHENE	.43	.29
DIBENZOFURAN	.24	.15
FLUORENE	.48	.21
PHENANTHRENE	1.0	1.0
ANTHRACENE	.10	.15
FLUORANTHENE	.48	.74
PYRENE	.41	1.1
BENZO (a) ANTHRACENE	TRACE	.25
CHRYSENE	.14	.17
BENZO (a) PYRENE	TRACE	NOT DETECTED

phenanthrene concentration and compares them to ratios found in shallow soil sample EE-3. Weathering of each component of creosote proceeds at different environmental rates. Data from other landfills also exhibits similar variations from unweathered ratios (18). Increased levels of naphthalenes may be due to coal tar, which is often mixed with creosote in wood preservatives.

Phenol (carbolic acid), a common creosote additive, was identified in EE-3 soil. Phenol is extremely soluble in water as compared to the components of creosote and coal tar and has a much lower log Poct (octanol/water partition coefficient) value indicating a lower affinity towards soil adsorption (19). Migration downward as surface rain water percolates through the soil is expected.

Three phthalates were also identified. Phthalates are used and formulated in plastizing agents, plastic manufacturing, recycling, and processing. They are ubiquitous in the environment and nearly always encountered in landfills (20). Phthalates are highly lipophilic and exhibit low aqueous solubility; they are similar to creosote in this respect.

Benzo (a) pyrene, a high molecular weight PAH, is a combustion by-product of open air refuse burning (21). Because it was detected at low levels in only three samples, it is not expected to present a hazard despite its published toxicity.

Phenol, PAHs, and phthalates exhibit toxicity through ingestion and in aquatic organism testing. However, it is inappropriate to extrapolate this toxicity data to subsurface soil values.

6.3.4 Subsurface Soil Pesticide and PCBs

Only two contaminants were positively identified, both in shallow soil at EE-3:

PCB	CONCENTRATION
Aroclor 1242	3100 ug/kg
Aroclor 1254	1400 ug/kg

Both values are estimates, as laboratory quality control did not meet EPA criteria. It is probable that because both Aroclors are mixtures of chlorinated biphenyls, concentrations reported are overestimates of "true" levels. PCBs are extremely lipophilic and virtually insoluble in water. They were used primarily in electrical transformers and capacitors, but many waste oils are contaminated with PCBs (22). Pesticide and PCB data are presented in detail in Appendix F.

PCBs are readily absorbed from aqueous solution onto any solid particles and do not easily leach from soil (23, 24). The rate of PCB movement in saturated soil has been found to be between one-tenth and one one-hundredth the rate of ground water movement (25). Rates of PCB mobility in soil vary, however, with the most heavily chlorinated PCBs being the least mobile. Therefore, migration is not expected to be significant (26).

The toxicity of PCBs has been documented (20) but extrapolation of this hazard to soil data is not possible. The levels are far less than 50,000 ug/kg, which marks the lowest level at which an oil is considered contaminated.

6.3.5 Subsurface Soil Herbicides

No measurable amounts of 2,4-D; 2,4,5 T; 2,4,5-TP (Silvex); or MCPA were detected in any of the subsurface soil samples. Neither were any of the reported components of 2,4-D Bleed; 2,4-DCP Tar; or MCPA Tar solid wastes from herbicide production identified. Herbicide analysis data is presented in Appendix F.

6.3.6 Subsurface Soil Tentatively Identified Compounds

A limited number of compounds , Table 6.3, were detected which are not on the Hazardous Substance List (HSL). Positive identification of all of these compounds was not possible and quanities are estimates only. Analytes appear to be chiefly hydrocarbons of unknown origin. Nineteen compounds were detected in the shallow soil sample from EE-3. This sample was collected in the former open-burning and municipal waste disposal area. Again, the presence of this class of compounds is consistent with historical waste disposal practices. A complete summary of this data is presented in Appendix F.

6.3.7 Subsurface Soil Inorganic Results

Results have been statistically summarized in Table 6.4. Appendix F contains a complete list of inorganic soil analyses.

Minimum and maximum concentrations of each element are presented with corresponding sample location number to display the range of values measured for each analyte. The median is the middle value of a set of data points. All shallow subsurface soil data has been combined and statistically reduced to yield: average concentration, standard deviation, and skew. Similar data is presented for the deep soil samples. The Student's t-test was employed to determine if significant differences exist between composition of shallow versus deep soil samples. Critical (calculated) t values greater than tabled, indicate a significant difference exists between the two soil populations at the 90% confidence interval.

Aluminium, calcium, chromium, magnesium, manganese, and potassium concentrations in shallow soils are statistically greater than in deep soil samples. The highest soil concentrations of mercury, barium, and sodium were detected in EE-9 soils. These elements have been identified as compo-

TABLE 6.3
SUMMARY OF TENTATIVELY IDENTIFIED ORGANIC COMPOUNDS
SUBSURFACE SOILS
(ug/kg)

	SAMPLE LOCATIONS AND DEPTH			
COMPOUND	EE-3 10-30'	EE-3 20'-GW	EE-5 10-30'	EE-5 20'-GW
UNKNOWN	4200J			
DIMETHYL BENZENE ISOMER	1700J			
DIMETHYL BENZENE ISOMER	1200J			
UNKNOWN	4600J			
1-ETHYL-2-METHYL BENZENE	860J			
TRIMETHYL BENZENE	1300J			
DECANE	1800U			
P-PHOSPHORIC ACID, TRIBUTYL ESTER	1700J			
UNKNOWN	5900J			
UNKNOWN	2000J			
UNKNOWN	4200J			
UNKNOWN	7700J			
UNKNOWN HYDROCARBON	2900J			
UNKNOWN	5000J			
UNKNOWN	1800J			
UNKNOWN	9400J			
UNKNOWN	2300J			
UNKNOWN	2400J			
UNKNOWN	300J			
2-BUTOXY ETHANOL		520J		
UNKNOWN		260J		
UNKNOWN			200J	
UNKNOWN				220J

J: ESTIMATED CONCENTRATION ONLY
GW: GROUND WATER

TABLE 6.4
RESOURCE RECOVERY CORP., PASCO, WA.
STATISTICAL SUMMARY OF INORGANIC RESULTS FOR SOIL
(mg/kg)

	ALL SOIL DATA					SHALLOW SUBSURFACE SOIL SAMPLES			DEEP SUBSURFACE SOIL SAMPLES					
PARAMETER	MINIMUM CONC.	SAMPLE LOCATION	MAXIMUM CONC.	SAMPLE LOCATION	MEDIAN	AVERAGE	STANDARD DEVIATION	SKEW	AVERAGE	STANDARD DEVIATION	SKEW	CRITICAL T	TABLED T	SIGNIFICANT DIFFERENCE
ALUMINIUM	4671.00	EE5 20'-GW	8934.00	EE5 10-20'	7066.50	7868.44	831.73	0.13675	5762.11	960.12	0.37751	4.97	1.75	YES
ANTIMONY	4.00	EE6 10-30'	10.00	EE1 30'-GW	6.50	6.56	1.24	-0.76624	6.78	1.39	1.58768	-0.36	1.75	NO
ARSENIC	3.20	EE1 30'-GW	7.10	EE5 10-20'	3.30	3.69	1.94	-0.04869	3.26	0.05	-0.22361	0.67	1.75	NO
BARIUM	79.00	EE5 20'-GW	652.00	EE9 10-30'	105.00	169.33	181.15	2.46688	96.33	12.10	-0.14216	1.21	1.75	NO
BERYLLIUM	0.30	EE3 10-30'	0.60	EE6 30'-GW	0.50	0.50	0.09	-1.22474	0.41	0.11	0.45560	#	1.75	#
CADMIUM	1.00	EE1 10-30'	1.40	EE3 10-30'	1.00	1.18	0.34	1.82571	1.04	0.10	2.06732	1.13	1.75	NO
CALCIUM	7616.00	EE5 20'-GW	15703.00	EE5 10-20'	11169.00	11946.00	1888.94	0.44513	10223.78	1889.17	0.68412	1.93	1.75	YES
CHROMIUM	4.00	EE4 20'-GW	28.00	EE3 10-30'	10.50	13.44	5.53	2.35936	7.67	1.94	-0.48686	2.96	1.75	YES
COBALT	11.00	EE2 10-30'	15.00	EE6 30'-GW	13.00	12.44	1.01	-0.22307	12.44	1.33	0.46128	*	1.75	NO
COPPER	10.00	EE5 20'-GW	19.00	EE3 10-30'	12.00	13.00	2.96	1.22938	11.67	1.22	0.67358	1.25	1.75	NO
IRON	20000.00	EE2 10-30'	27462.00	EE4 10-20'	22890.00	23348.44	2483.46	0.25723	22570.56	1684.74	1.18219	0.78	1.75	NO
LEAD	2.90	EE5 20'-GW	100.00	EE3 10-30'	5.45	16.82	31.23	2.46327	4.16	0.96	0.82732	1.22	1.75	NO
MAGNESIUM	4523.00	EE5 20'-GW	8363.00	EE5 10-20'	6187.50	6796.56	755.59	0.79536	5310.00	712.32	-0.06348	4.29	1.75	YES
MANGANESE	313.00	EE5 20'-GW	486.00	EE5 10-20'	416.50	435.56	36.22	0.20935	390.11	46.19	-0.09057	2.32	1.75	YES

TABLE 6.4 (CONT.)

STATISTICAL SUMMARY OF INORGANIC RESULTS FOR SOIL
(mg/kg)

	ALL SOIL DATA					SHALLOW SUBSURFACE SOIL SAMPLES			DEEP SUBSURFACE SOIL SAMPLES					
PARAMETER	MINIMUM CONC.	SAMPLE LOCATION	MAXIMUM CONC.	SAMPLE LOCATION	MEDIAN	AVERAGE	STANDARD DEVIATION	SKEW	AVERAGE	STANDARD DEVIATION	SKEW	CRITICAL T	TABLED T	SIGNIFICANT DIFFERENCE
MERCURY	0.10	EE1 10-30'	0.60	EE9 10-30'	0.10	0.18	0.16	2.17238	0.11	0.03	2.47487	1.19	1.75	NO
NICKEL	8.00	EE1 10-30'	14.00	EE5 10-20'	9.00	9.78	1.79	1.60545	8.67	0.50	-0.70711	#	1.75	#
POTASSIUM	1508.00	EE2 30'-GW	2942.00	EE4 10-20'	2519.00	2692.22	166.35	0.37228	2105.00	365.50	-0.28827	4.39	1.75	YES
SELENIUM	1.80	EE1 10-30'	9.50	EE7 10-30'	1.90	3.00	2.53	2.17271	2.66	2.38	2.47289	0.30	1.75	NO
SILVER	1.70	EE4 20'-GW	3.50	EE8 10-30'	2.60	2.62	0.56	0.04378	2.44	0.60	0.37146	0.65	1.75	NO
SODIUM	522.00	EE2 10-30'	1406.00	EE9 10-30'	605.00	736.33	270.82	1.85132	587.78	41.30	0.34826	1.63	1.75	NO
THALLIUM	2.00	EE1 10-30'	5.00	EE6 10-30'	2.00	2.44	1.01	2.06732	2.00	*	*	1.32	1.75	NO
TIN	9.00	EE1 10-30'	11.00	EE4 10-20'	10.00	10.00	0.50	*	9.78	0.44	-1.33631	1.00	1.75	NO
VANADIUM	35.70	EE7 30'-GW	61.30	EE4 10-20'	44.45	45.92	6.77	1.31200	44.33	5.76	0.85666	0.54	1.75	NO
ZINC	40.00	EE5 20'-GW	218.00	EE7 10-30'	53.50	76.00	53.98	2.35143	47.67	6.36	0.66529	1.56	1.75	NO

NOTE: STATISTICAL ANALYSES INCLUDE VALUES FLAGGED U AND J
STUDENTS T-TEST ASSUMES DATA ARE NORMALLY DISTRIBUTED
* DENOTES PARAMETER WAS NOT ANALYZED FOR OR CONTROL SAMPLES WERE NOT IDENTIFIED
R DENOTES PARAMETER WAS REJECTED
\# THE STUDENT'S T-TEST STATISTIC IS NOT APPLICABLE BECAUSE ALL BERYLLIUM AND NICKEL DATA ARE LESS THAN A FACTOR OF 2 ABOVE THE DETECTION LIMIT.

nents of chlor-alkali wastes in the adjacent burial Zone E. Cadmium, copper, chromium and lead values were highest in soils at EE-3, the former municipal waste disposal area. Zinc and several other metals were measured above the statistical average soil levels at EE-7, adjacent to the former open pit which received liquid metal cleaning and finishing wastes. No data point was significantly different from average at the 99% confidence interval.

6.4 Analytical Results For Ground Water

6.4.1 Field Measurements of pH, Conductivity, and Temperature

Three parameters (pH, conductivity, and temperature) were measured in water with portable instruments in the field, Table 6.5.

Specific conductivity is an indirect measure of total dissolved solids in water, however, no direct relation exists because conductivity is a function of electrolytic species present. pH is used to measure the acidity or basicity of dilute aqueous solutions. Neither conductivity nor pH exceed Federal Drinking Water Standards.

6.4.2 Volatile Organic Compounds Detected in Ground Water

Table 6.6 lists volatile organic compounds detected in wells at the site. Federal Drinking Water Guideline Recommended Highest Safe Levels (27) for each compound are also included in Table 6.6. Neither methylene chloride nor acetone are included in the table because levels measured are indicative of laboratory generated contamination.

Volatile organics (VOAs) were detected in groundwater from only three monitoring wells: EE-2, EE-3, and JUB-2. Monitoring well EE-3 is located beneath an area formerly used for open burning and municipal waste

TABLE 6.5
FIELD MEASUREMENTS TAKEN AUGUST 8, 1985

MONITORING WELL	CONDUCTIVELY UMHOS	TEMPERATURE °C	pH
EE1	490	18	7.7
EE2	710	17	7.2
EE3	570	18	6.8
EE4	600	18	*
EE5	700	18	*
EE6	475	18	*
EE7	491	18	*
EE8	490	17	*
EE9	550	18	*

* : NO DATA

TABLE 6.6
POSITIVELY IDENTIFIED VOLATILE ORGANIC COMPOUNDS IN GROUND WATER
(ug/l)

COMPOUND	FEDERAL DRINKING WATER GUIDELINES HIGHEST SAFE LEVEL	SAMPLE LOCATION EE-2	EE-3	JUB-2
1,1-DICHLOROETHYLENE	400	5.0	50.0U	13.0
1,1-DICHLOROETHANE	-	15.0	64.0	35.0
TRANS-1, 2-DICHLOROETHYLENE	270	9.0	50.0U	15.0
CHLOROFORM	100	3.0	50.0U	17.0
1,1,1-TRICHLOROETHANE	1000	70.0 ✓	420.0 ✓	168.0 ✓
TRICHLOROETHYLENE	4.5	65.0 ✓	480.0 ✓	164.0 ✓
TETRACHLOROETHYLENE	3.5	32.0 ✓	5.0U	5.0U
TOLUENE	-	5.0U	230.0	5.0U
TOTAL XYLENE	620	5.0U	63.0	5.0U

disposal. Wells EE-2 and JUB-2 are both down gradient of ground water flow through this area. All three are on the perimeter of burial Zone A, Figure 5.2.

Interpretation of the data is complicated by elevated detection limits for the sample from well EE-3. Materials may have been present at EE-3 but below laboratory reported detection limits.

The seven chlorinated volatiles listed in Table 6.6 detected have numerous uses as solvents, degreasers, paint and varnish intermediates, paint removers, dry cleaning fluids, plastics manufacturing, organic synthesis, etc. The presence of these compounds in ground water below the former municipal waste disposal and burning area is not unusual. These compounds are ubiquitous in the drinking water of industialized areas (28).

All the compounds in Table 6.6 have high vapor pressures and a low potential for bioaccumulation. Removal of these compounds is almost exclusively through volatilization from the aqueous system and degassing out of the vadose zone followed by rapid oxidation in the atmosphere by hydroxyl radicals. Movement of these contaminants in ground water will be controlled in part by the following factors: density of the detected contaminants will cause downward vertical migration while volatility would lead to upward movement; high soil/water partition coefficients may result in adsorption onto soils retarding migration; bacteria may decrease contaminant concentrations through biodegradation; dispersion caused by diffusion may be assumed to be negligible; recharge and the soil matrix will control horizontal and vertical ground water advection.

Assuming a geometric progression for contaminant concentration gradients in ground water and using the data from EE-3 and either EE-2 or JUB-2, aqueous volatile organic concentrations could decrease to below 5

ug/l (the standard EPA/CLP detection limit for these compounds) less than 800 feet down gradient from monitoring well EE3. Since the dates of active site use are known, a migration rate has been estimated (based on this geometric decrease) to be very roughly 40-80 feet per year. The closest irrigation well is 1600 feet down gradient from well EE3, therefore, horizontal migration is not expected to be a significant problem. Irrigation wells are usually screened deeper in an aquifer than monitoring wells since a constant water supply for high volume pumping is required. Irrigation supply water may be vertically displaced away from potentially contaminated shallow zones of ground water. Studies of aquifer decontamination and water reclamation based on ambient air spray head aeration (29) have demonstrated a 90% removal of chlorinated volatile organics. Irrigation should produce an effect equivalent to aeration especially if volatilization from the wetted surface of soil is taken into account. Further, since irrigation water which percolates down through the vadose zone soil to ground water would be significantly less contaminated with these compounds than the ground water, dilution of ambient ground water contaminants by cleaner water will result.

Two aromatic volatile organics, toluene and xylene, were detected in ground water from monitoring well EE-3. The principal source of these compounds may be coal tar as noted in Section 6.3.3, although they are both major constituents of gasoline and are used in numerous paint and lacquer manufacturing processes (19).

High log Poct values for toluene and xylene mean adsorption may be significant. However, both toluene and xylene possess high vapor pressures and may biodegrade to methylated catechols (28). The principle mechanism

for removal is volatilization and subsequent airborne photodecomposition. Environmental fate and movement should be similar to the chlorinated volatiles.

6.4.3 Base/Neutral/Acid (BNA) Organic Compounds Detected in Ground Water

4-methyl phenol was detected at 6 ug/l in water from monitoring well EE-3. Bis (2-ethylhexyl) phthalate (BehP) was detected in: EE-2 at 6 ug/l, EE-4 at 39 ug/l, and EE-5 at 7.8 ug/l. No other BNAs were detected in any of the other wells sampled by E&E. Appendix G contains complete tables of BNA data from aqueous analyses.

4-methylphenol (p-cresol) is a water soluble component of coal tar and further supports the record that this material was buried in the municipal waste disposal area above EE3. No drinking water quality guideline limits are reported for cresol.

BehP is in the same chemical family of compounds as the three phthalates identified in the BNA soil results from EE3. However, it is the least soluble of the four phthalates found, and its presence may be the result of laboratory induced contamination of the sample. No drinking water standards are reported for phthalates. BehP is not volatile and is likely to be absorbed onto soils rather than solubilize into water (28).

None of the PAHs found in soils at EE3 were detected in the ground water.

6.4.4 Pesticides and PCBs Detected in Ground Water

No pesticides or PCBs were reported in any of the sampled wells above laboratory detection limits. PCBs were not found in the ground water at EE-3, where both Aroclor-1242 and Aroclor-1254 were measured in the shallow soil sample. A complete data list is in Appendix G.

6.4.5 Herbicides Detected in Ground Water

No herbicides, herbicide production wastes or by-products were detected in any of the ground water samples collected during this investigation. Appendix G contains a complete listing of aqueous herbicide results.

6.4.6 Tentatively Identified Organic Compounds (TICs) in Ground Water

The largest number and highest amount of TICs detected was in water from monitoring well EE-3 (Table 6.7). Substituted benzene compounds predominate and may be components of coal tar, gasoline, or paint wastes. Anthropogenic origins for all TICs cannot be established. See Appendix G for a complete list of TIC data.

6.4.7 Inorganic Analyses of Ground Water

Table 6.8 summarizes the inorganic ground water results, however, no t-test statistics were computed. Lithologic data and inorganic soil analyses show uniform distribution of metals over the site. Ground water analysis results are extremely heterogeneous over very short distances. Elemental concentration bar graphs, projected onto a site map, are presented in Figures 6.3, 6.4, and 6.5 for three metals. The spatial variations in concentrations across the site shown in these figures do not reflect the expected levels based on ground water flow.

Significant variations in concentrations were found in adjacent wells throughout the site. The two upgradient background monitoring wells, EE-1 and JUB-Control are approximately 420 feet apart in similar lithologies and at the same ground water elevation. Concentrations at EE-1 are the lowest values measured while JUB-Control has the highest values for eighteen out of twenty-four analytes. Data from well sets EE-5/EE-4, JUB-3/WSW, and EE-2/EE-3/JUB-2 also show widely variable data for nearly all analytes. Of

TABLE 6.7
RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF TENTATIVELY IDENTIFIED BASE/NEUTRAL/ACID COMPOUNDS FOR
GROUNDWATER SAMPLES COLLECTED JULY/AUGUST 1985
(ug/l)

LOCATION:	EE1	EE2	EE3	EE4	EE5	EE6	EE7	EE8	EE9	JUB CNTR	JUB1	JUB2	JUB3	JUB4	WSW
COMPOUND															
ALCOHOL	190J														
ALCOHOL	20J														
ALKENE	600J	16J				62J									
HYDROCARBON	22J														
CARBOXYLIC ACID	12J														
CARBOXYLIC ACID	94J														
UNKNOWN	26J	8J	4J		15J	68J	12J								
SATURATED HYDROCARBON		22J													
UNKKNOWN		6J													
DIMETHYL BENZENE			696J												
DIMETHYL BENZENE			364J												
ALKYL BENZENE			12J												
SUBSTITUTED BENZENE			26J												
ALKYL BENZENE			120J												
TRIMETHYL BENZENE			42J												
METHYL KETONE			6J												
ALKYL BENZENE			40J												
ALKYL BENZENE			84J												
ALKYL BENZENE			20J												
ALKYL BENZENE			6J												
SUBSTITUTED ALKANE			16J												
SUBSTITUTED ALKANE			8J												
KETONE			16J												
KETONE						160J									
UNKNOWN						12J									
SUBSTITUTED CARBOXYLIC ACID							158J								
UNKNOWN								14J							
UNKNOWN								6J							
PHTHALATE								6J							
UNKNOWN									18J						
UNKNOWN									8J						
UNKNOWN									4J						
UNKNOWN				6.7J											
HYDROCARBON				11J											
UNKNOWN				27J											
HEXADECANOIC ACID				18J											
UNKNOWN				22J											
UNKNOWN				25J											
CARBOXYLIC ACID										7.6J	6.2J		4.8J	5.6J	
C-3 SUBSTITUTED BENZENE											6.2J		4.8J	7.2J	
C-2 SUBSTITUTED BENZENE												13J			

J: Estimated Concentration

TABLE 6.8
STATISTICAL SUMMARY OF INORGANIC RESULTS FOR ALL GROUND WATER
(ug/l)

PARAMETER	MINIMUM CONC.	SAMPLE LOCATION	MAXIMUM CONC.	SAMPLE LOCATION	MEDIAN	AVERAGE TEST SAMPLES	STANDARD DEVIATION TEST	SKEW TEST SAMPLES
ALUMINIUM	61.00	WSW	129800.00	JUB CNTR.	22560.00	32366.93	33734.22	1.68778
ANTIMONY	12.00	EE1/WSW	19.00	EE2	12.00	12.73	2.02	2.48679
ARSENIC	10.00	EE1/WSW	40.00	JUB WELL 4	10.00	14.04	10.00	2.15411
BARIUM	63.00	WSW	2148.00	EE5	526.00	746.80	668.19	0.99745
BERYLLIUM	0.50	EEQ	10.40	JUB CNTR.	2.10	2.65	2.55	1.91232
CADMIUM	1.90	EE1/WSW	3.50	EE4	1.90	2.21	0.51	1.34235
CALCIUM	57180.00	WSW	332200.00	JUB CNTR.	94780.00	110555.33	70881.10	2.24792
CHROMIUM	11.00	WSW	176.00	JUB CNTR.	60.00	63.47	43.37	1.29584
COBALT	3.90	EE1/WSW	184.00	JUB CNTR.	32.00	47.45	46.86	1.54527
COPPER	1.70	WSW	254.00	JUB CNTR.	62.00	77.38	70.49	1.21140
IRON	24.00	WSW	268300.00	JUB CNTR.	52150.00	73957.53	72112.50	-
LEAD	5.00	WSW	180.00	JUB CNTR.	36.95	45.99	33.70	-0.69075
MAGNESIUM	20600.00	WSW	99060.00	JUB CNTR.	29930.00	37886.67	20654.54	1.92679
MANGANESE	3.00	WSW	5281.00	JUB CNTR.	1394.00	1742.80	1468.37	0.89281
MERCURY	0.18	EE1	1.00	JUB CNTR.	0.20	0.32	0.24	1.82907
NICKEL	16.00	WSW	138.00	JUB CNTR.	46.00	53.27	39.19	1.08324
POTASSIUM	7315.00	WSW	26000.00	JUB CNTR.	11690.00	12289.53	5052.73	1.60305
SELENIUM	5.00	WSW	25.00	JUB CNTR.	25.00	23.67	5.16	-3.47440
SILVER	3.30	EE1	19.10	JUB CNTR.	6.80	7.25	4.17	1.49099
SODIUM	31920.00	EE3	47580.00	EE2	35780.00	36338.67	4054.41	1.53454
THALLIUM	10.00	EE1/WWS	10.00	JUB CNTR.	10.00	10.00	*	*
TIN	18.00	EE1	88.00	JUB WELL 2	18.00	25.13	19.46	2.64291
VANADIUM	15.90	EE1	493.70	JUB CNTR.	111.30	136.81	123.82	1.67899
ZINC	8.00	WSW	673.00	JUB CNTR.	289.00	277.80	168.18	0.55741

NOTE: STATISTICAL ANALYSES INCLUDE VALUES FLAGGED U AND J
STUDENTS T-TEST ASSUMES DATA ARE NORMALLY DISTRIBUTED
* DENOTES PARAMETER WAS NOT ANALYZED FOR OR CONTROL SAMPLES WERE NOT IDENTIFIED
R DENOTES PARAMETER WAS REJECTED

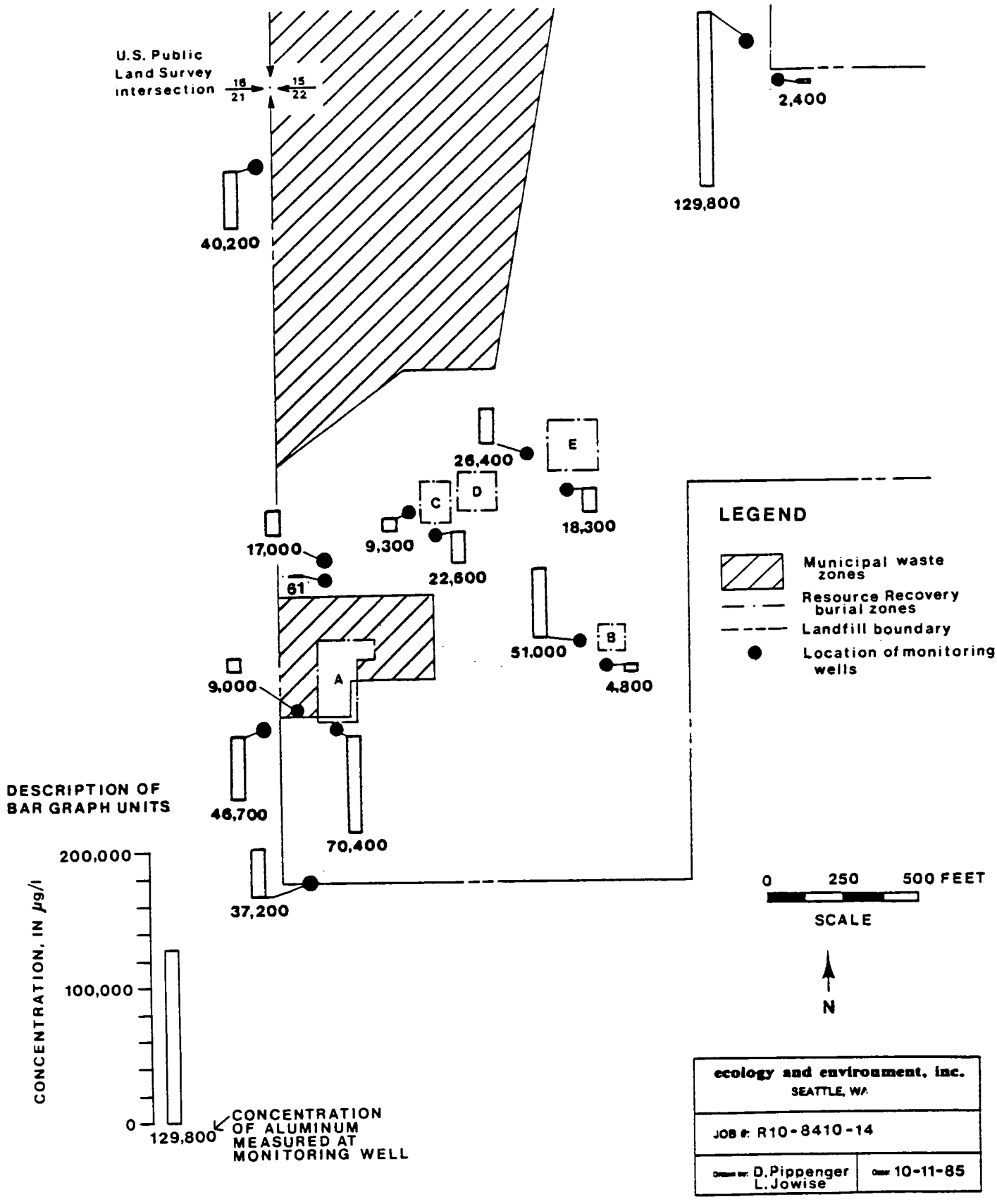


Figure 6.3 Concentration of aluminum, in micrograms per liter, measured in ground water at monitoring wells, Resource Recovery study area, Pasco, Washington.

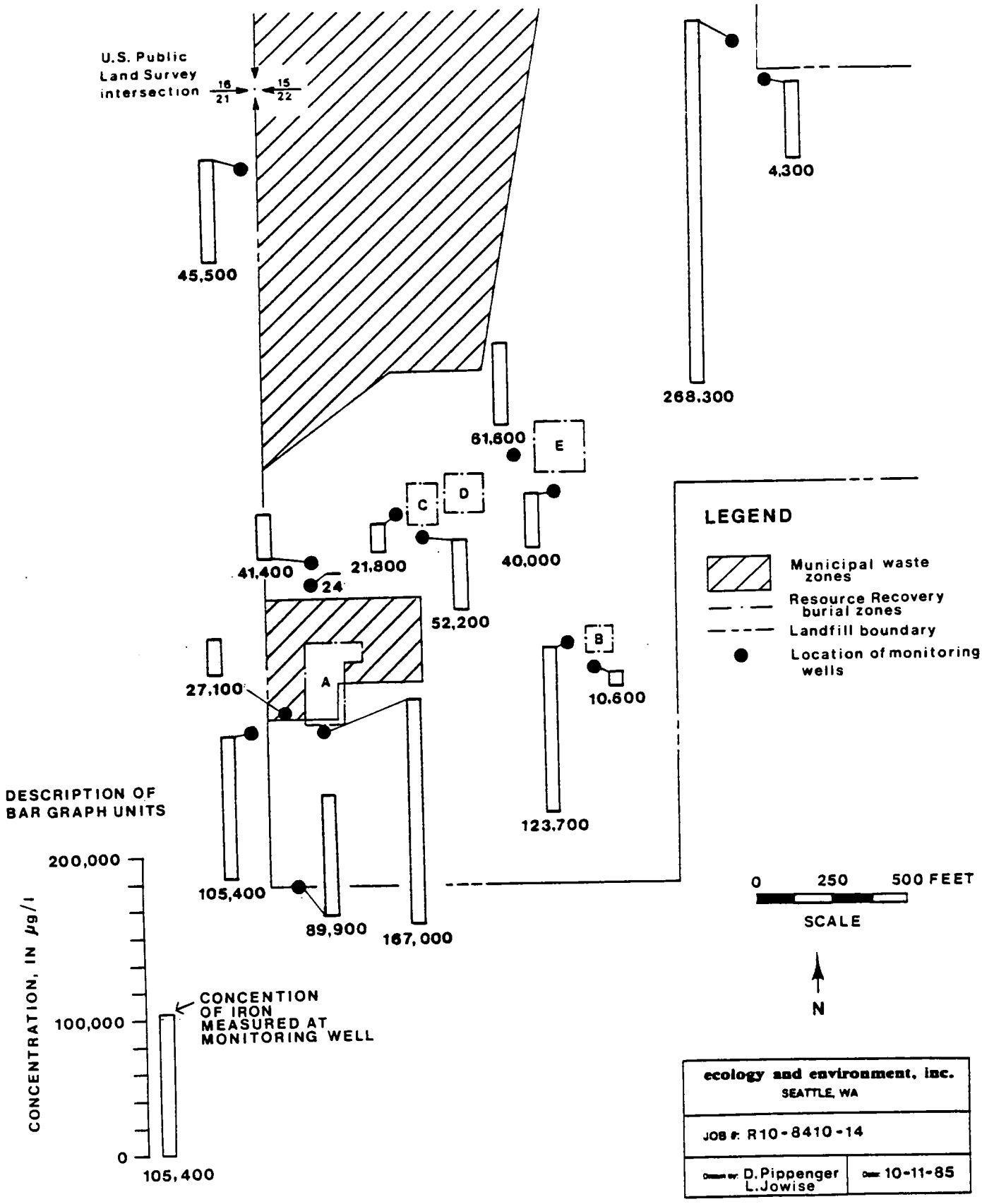


Figure 6.4 Concentration of iron, in micrograms per liter, measured in ground water at monitoring wells, Resource Recovery study area, Pasco, Washington.

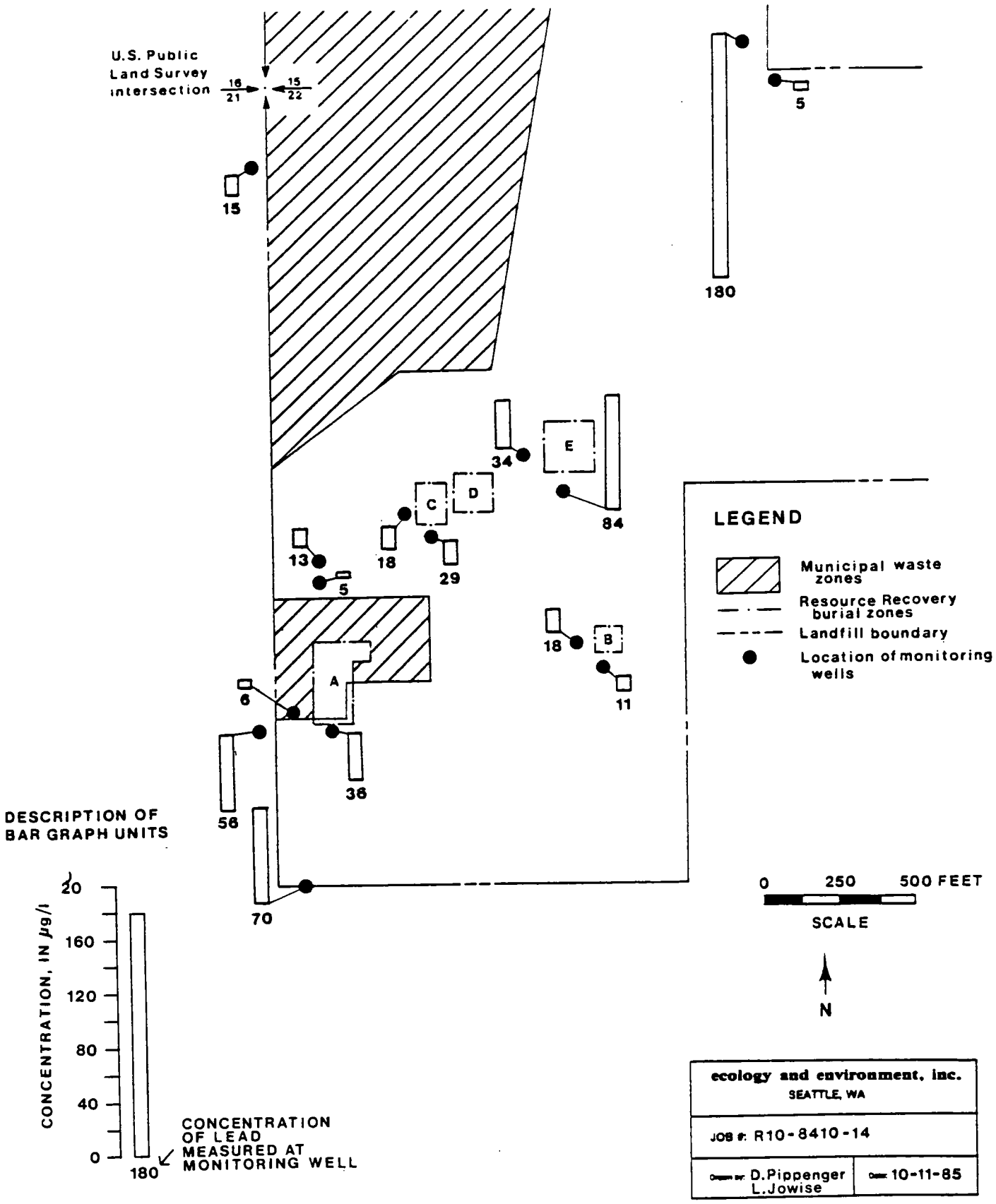


Figure 6.5 Concentration of lead, in micrograms per liter, measured in ground water at monitoring wells, Resource Recovery study area, Pasco, Washington.

the analytes with detectable quantities, only sodium demonstrates uniformity between wells. A concentration gradient based on dilution is not apparent because relative amounts of individual elements in each monitoring well are independent. The limited amount of conductivity and pH data provide no explanation of data variability.

Data collected from JUB monitoring wells over several years is presented in Table 6.9 along with the primary and secondary drinking water standards. In every case, concentrations increased between 1982 and 1985.

Rigorous Quality Assurance reviews of both field and analytical quality controls indicate that these anomalous data are not the result of field or lab errors. Variations in well construction probably do not account for the results.

Suspension of fine clay particles appears unlikely because the elemental distribution in groundwater does not watch the expected elemental distribution in either Montmorillonitic or Illitic clays (30).

Possible explanations for ground water anomalies include:

1. Unknown point sources of contaminants
2. Micro-acidic environments promoting dissolution
3. Highly channelized flow regime
4. High levels of non-electrolytic soluble species and/or dissolved solids
5. Unsuspected field or lab quality control problems

TABLE 6.9
RESOURCE RECOVERY, PASCO, WA.
RESULTS OF INORGANIC ANALYSES OF GROUND WATER VS. TIME a
(ug/l)

ELEMENTS	PRIMARY AND SECONDARY DRINKING WATER STANDARDS	JUB 1		JUB 2		JUB 3			JUB 4		JUB CONTROL		
		FEB. 1982	JULY/AUG. 1985	FEB. 1982	JULY/AUG. 1985	FEB. 1982	SEPT. 1984	JULY/AUG. 1985	DEC. 1982	JULY/AUG. 1985	FEB. 1982	SEPT. 1984	JULY/AUG. 1985
ALUMINIUM		*	37210	*	46670	*	41500	17030	*	40180	*	102000	129800
ANTIMONY		*	12U	*	12U	*	20U	12U	*	12U	*	20U	12U
ARSENIC	50	10.0U	10.0U	10U	12.0	10.0U	28J	10.0U	10U	40.0	10U	39J	37.2
BARIUM	1000	100U	896	100U	834	100U	785	350	500U	838	100U	[1631]	[1656]
BERYLLIUM		*	3.1	*	3.6	*	5U	1.7	*	3.0	*	7	10.4
CADMIUM	10	1U	2.8	1U	1.9U	1U	1U	1.9U	1U	1.9U	1U	1.9	1.9U
CALCIUM		*	101100	*	116100	*	*	77740	*	100700	*	*	332200
CHROMIUM	50	5	[60]	5U	[71]	5U	42	31	5U	[51]	5U	[106]	[176]
COBALT		*	67	*	87	*	50U	23	*	4	*	*	184
COPPER	1000	10U	103	10U	109	10U	120J	33	10U	77	10U	280J	254
IRON	300	[1600]	[89890]	[610]	[105400]	[350]	[97450]	[41430]	[700]	[95460]	[490]	[199900]	[268300]
LEAD	50	50	[70]	5U	[56]	50	[70]	13.2	5U	15.3	5U	[160]	[180]
MAGNESIUM		*	38990	*	41490	*	*	29140	*	39840	*	*	99060
MANGANESE	50	[110]	[2695]	[70]	[2232]	10U	[1694]	[733]	20	[1394]	40	[4380]	[5281]
MERCURY	2	0.50	0.6	0.5U	0.2	0.5U	0.2U	0.6	0.5U	0.2	0.5U	0.2U	1.0
NICKEL		*	61	*	50	*	63J	16U	*	23	*	162J	138
POTASSIUM		*	12410J	*	13420J	*	*	9598J	*	12290J	*	*	26000J
SELENIUM	10	50	25UJ	5U	25UJ	5U	2	25UJ	5U	250J	5U	2	25UJ
SILVER	50	50	9.8	5U	11.1	5U	10U	8.0	5U	9.3	5U	10U	19.1
SODIUM		*	35960	*	39370	*	*	35140	*	36120	*	*	41800
THALLIUM		*	10UJ	*	10UJ	*	10U	10UJ	*	10UJ	*	10U	10UJ
TIN		*	.18U	*	88	*	20U	18U	*	52	*	20U	18U
VANADIUM		*	164.5	*	195.8	*	200U	79.4	*	150.0	*	302	493.7
ZINC	5000	500	262	500	354	5U	207	132	50U	211	50U	514	673
CYANIDE		*	*	*	*	*	10U	*	*	*	*	10U	*

a - FEB. AND DEC. 1982 DATA - FROM JUB REPORT (12)
SEPT. 1984 DATA - E & E SITE INSPECTION (1)
JULY/AUGUST 1985 DATA - THIS STUDY
* - NOT ANALYZED
[ ] VALUE EXCEEDS DRINKING WATER STANDARDS

7.0 SUMMARY AND RECOMMENDATIONS

Resource Recovery Corporation received and disposed of several million gallons of liquid industrial wastes and 50,000 drums of material for disposal between 1972 and 1974. Liquids were evaporated to dryness from two lined and one unlined ponds and subsequently covered with layers of soil, polyethylene sheeting, and capped with an additional soil layer. Drums were stacked and buried in two unlined pits capped with a similar surface liner system. Ecology and Environment, Inc. installed nine monitoring wells and submitted both soil and ground water samples to EPA contract labs for standard HSL organic and inorganic analyses and herbicides in order to document any migration or contamination from these burial zones.

7.1 Conclusions

The following points summarize E&E's conclusions reached in the investigation of Resource Recovery Corporation disposal site during 1985.

- Ground water contours confirm the flow of ground water is towards the southwest.
- Organic contamination in the soil was found almost exclusively in the shallow (10-30 feet) soil sample collected from the former municipal waste disposal and burn area.

  The low level organic contaminants identified in the soil are indicative of:

  - wood preservatives, e.g., creosote, coal tar, and phenol
  - plasticizers, e.g., phthalates
  - soil gas from organic decomposition, e.g., methane
  - transformer and capacitor fluid, e.g., PCBs
  - no herbicide or herbicide waste products were identified

- hydrocarbons of unknown origin, possibly the carrier for wood preservatives or diesel and lubricating oils.
- only the soil gases are expected to exhibit substantial migration.

o Inorganic soil constituents were uniformly distributed throughout the site with only these minor variations in concentrations:
- slightly elevated barium, mercury, and sodium levels were associated with the shallow (10-30 feet) soil samples near the former chloroalkali waste pond.
- zinc was slightly elevated in the shallow (10-30 feet) soil sample taken outside the former metal finishings waste pond.

o Ground water contamination by organics occurred only beneath or adjacent to the former municipal disposal and burn area:
- volatile organics may be leaching from several source materials, including plastics, solvents, paints, gasoline, and coal tar
- only trichloroethylene and tetrachloroethylene concentrations exceeded recommended drinking water levels
- only 4-methylphenol was detected in the BNA fraction and may be due to coal tar
- only trace amounts of phthalate were found
- no PCBs or pesticides were found
- no herbicides or herbicide waste products were identified
- tentatively identified compounds are similar to those found in sediment samples
- the potential effects on irrigation do not appear to be significant based on the expected horizontal contaminant gradients, vertical irrigation well depths, volatilization of contaminants

during spraying, ground surface volatilization, and subsequent ground water dilution effects.

- o Inorganic ground water data displayed unexplainably wide variations in concentration across the site and between adjacent monitoring wells:
  - barium, chromium, iron, lead, and manganese exceeded primary and secondary drinking water standards
  - a significant increase in nearly all inorganic species occurred between 1982 and 1985 at monitoring wells across the entire site
- o No special additional analyses for dioxin were required because potentially dioxin contaminated materials or precursors were not identified.
- o No exposure routes or significant hazards were identified as a result of disposal practices or sample analyses.
- o Migration rates for trichloroethylene and tetrachloroethylene have been estimated to be on the order of 40 to 80 feet per year.
- o In summary, the results indicate that trace amounts of contaminants may have migrated outside of Resource Recovery Corporation's burial Zones A, CD, and E as described above. No evidence of contaminant migration from Zone B (the herbicide waste drum burial zone) was found. Some of the contaminants identified near Zone A may have leached from the area around the zone which had been used as an industrial burial and municipal waste open-burning area prior to development by Resource Recovery Corporation.

7.2 Recommendations

- o Areas where erosion or site activities have exposed plastic liner should be recovered with soil to preserve liner integrity.

- Drill cuttings and water drummed during field operations may be disposed on-site.
- Resampling and re-analysis of samples from each of the on-site monitoring wells and several of the surrounding irrigation wells will be necessary in order to explain the inorganic ground water data.
- Continue monitoring ground water with annual or bi-annual sampling and analyses to detect any onset of migration from a burial zone.
- A recent EPA study at Alkali Lake, Oregon (31), where similar Rhodia herbicide wastes were emptied from drums and buried, found parts per trillion levels of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans in the surface sediment. If herbicide or herbicide waste materials are detected by future monitoring around Zone B, the potential for dioxin contamination exists. However, as dioxins and furans have high partition coefficients (are readily and almost irreversibly adsorbed onto solids), their appearance in ground water is extremely unlikely.

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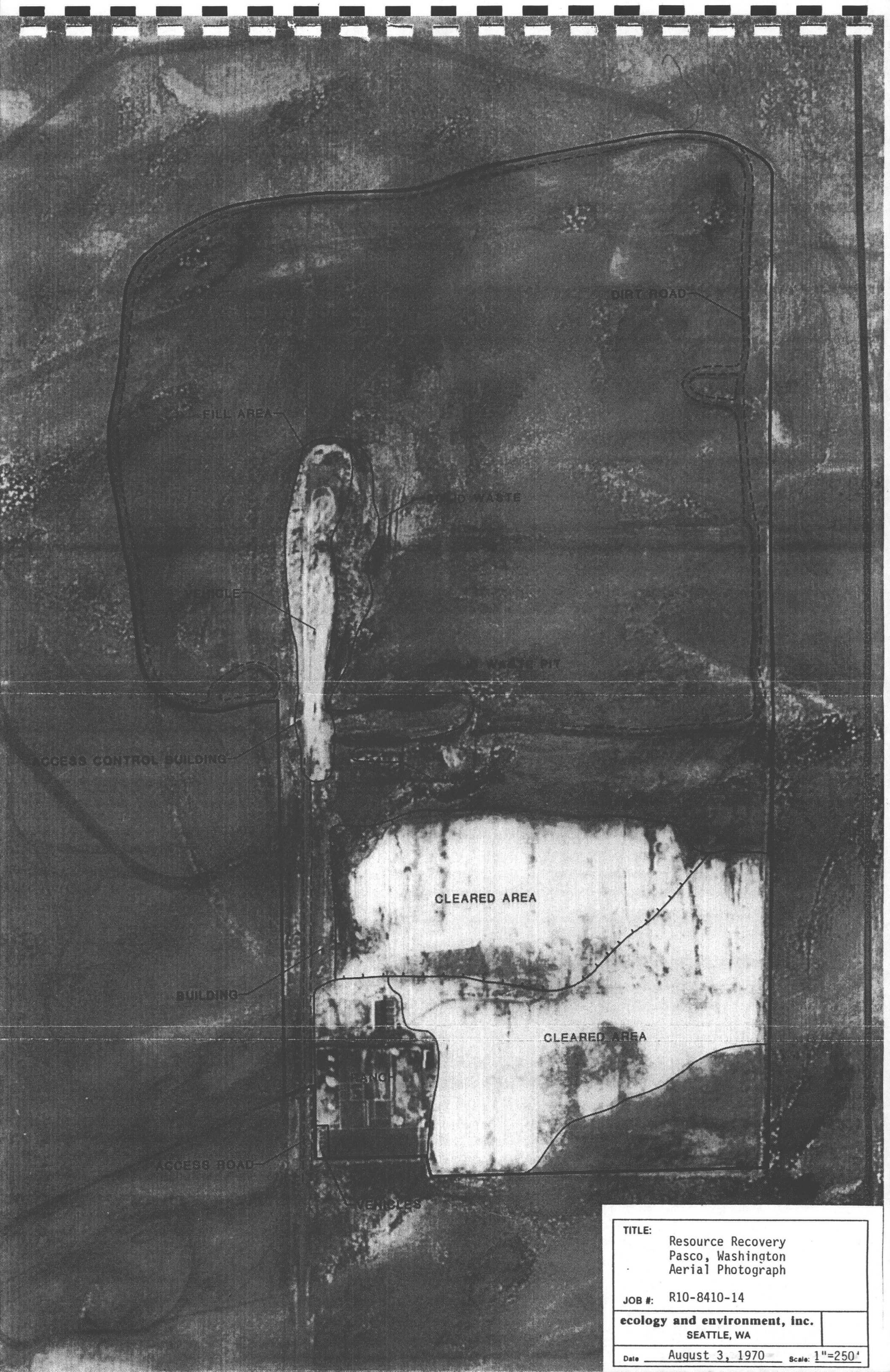
APPENDIX A

AERIAL PHOTOGRAPHY



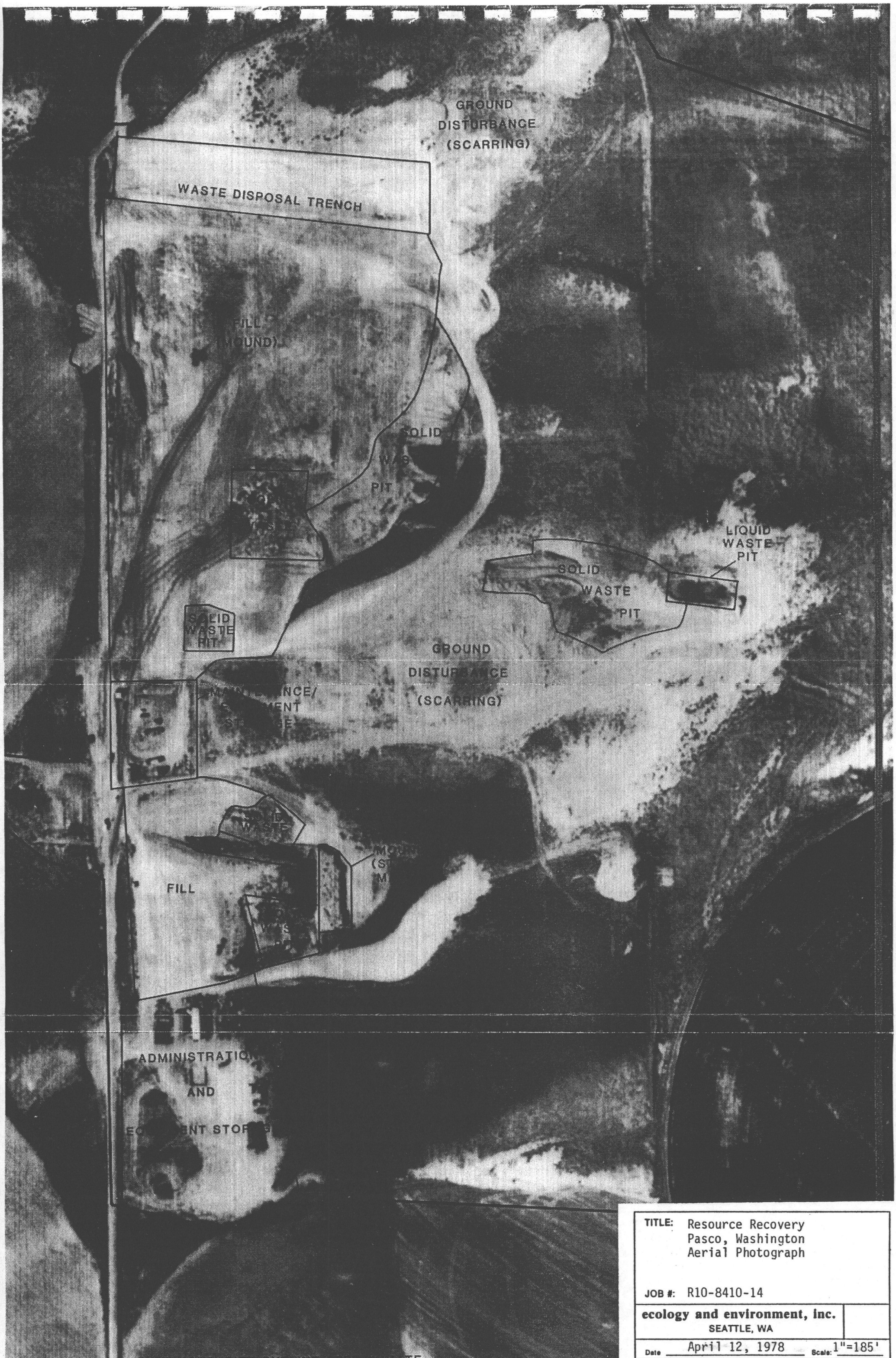
TITLE:	Resource Recovery Pasco, Washington Aerial Photograph
JOB #:	R10-8410-14
ecology and environment, inc. SEATTLE, WA	
Date: August 3, 1970	Scale: 1"=250'

TITLE:
Resource Recovery
Pasco, Washington
Aerial Photograph

JOB #: R10-8410-14

ecology and environment, inc.
SEATTLE, WA

Date May 11, 1973 Scale: 1"=335'



TITLE:	Resource Recovery Pasco, Washington Aerial Photograph
JOB #:	R10-8410-14
ecology and environment, inc. SEATTLE, WA	
Date: April 12, 1978	Scale: 1"=185'

APPENDIX B

DRILLING AND SAMPLE LOGS

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: R. Holtz
Date Completed: 8/02/85

Job No: TDD R10-8410-14 **Boring No:** EE-1
Location: 75' 11" SE of JUB control well
Surface Elev: 418.9 ft. **Datum:** AMSL
Casing Elev: 421.1 ft. **Datum:** AMSL
Total Depth: 88 ft. **Datum:** Below TOC
Groundwater: 363.6 ft. AMSL

WELL DETAILS		DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT		-- 0--	SM	SAND WITH SILT - fine- to fine-grained, well sorted, subrounded, light gray and frosted, trace surface loam, very dry. Eolian origin		
		4--	SW	SAND - Sand, 100% fine- to medium-grained, well sorted, subangular to subrounded, light to dark brown and clear to frosted. Quartz mica, feldspar, hornblende or basalt. Semi-dry.		
		-- 10--	SW	SAND - Sand, 100%, fine- to medium-grained, well to moderately well sorted, subangular to subrounded, light olive brown and clear to frosted. Semi-dry. Hard cemented sand layer 19-20'.	85310396 JA544 MJA210	Soil Composite
	2" SS CASING	20--	SW	SAND - Sand, 100%, fine- to medium-grained, well to moderately well sorted, pale to dark yellowish brown. Feldspar, hornblende mica. Semi-dry.		
BEN-TONITE SLURRY					85310397 JA545 MJA211	Soil Composite
		35--	SW	SAND - Sand, 100%, fine- top very fine-grained clear to light olive gray. Trace silt, trace pebbles (3-10mm) scattered throughout.		
		40--	SW	SAND - Sand, 100%, medium- to fine-grained, moderately well to well sorted, subrounded to subangular, frosted and dark yellowish brown. Trace pebbles. Quartz mica, hornblende or basalt, feldspar.		
FINE SAND CAP		-- 46				
GRAVEL		-- 49				
		-- 50--				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-1

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
	50	SP	SAND - Sand, 100%, medium- to coarse-grained, poorly sorted, angular, frosted to moderate olive brown, moist.		
2" SS CASING	55	SP	GRAVELLY SAND - Sand, 70%, medium- to very coarse-grained, poorly sorted, subrounded, dark gray to black and frosted, some mica, moist.		
	60	SW	SAND - Sand, 100%, medium- to coarse-grained, dark olive brown to dark gray.		
GRAVEL PACK	66	GP	SANDY GRAVEL - Gravel, 60%, coarse-grained, poorly sorted, subrounded, gray to black. Sand, 40%, medium- to very coarse-grained, poorly sorted, subrounded, dark gray to black, frosted. Feldspar, mica, quartz. Large cobbles in lower part.		
2" SS .010 SLOT SCREEN				85320877 JA554 MJA221	Aqueous Grab
2" SS SUMP	86				
	88		TOTAL DEPTH - 88 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: R. Holtz
Date Completed: 8/02/85

Job No: TDD R10-8410-14 **Boring No:** EE-2
Location: 30' SE of Area A
Surface Elev: 416.8 ft. **Datum:** AMSL
Casing Elev: 419.2 ft. **Datum:** AMSL
Total Depth: 88 ft. **Datum:** Below TOC
Groundwater: 348.8 ft. AMSL

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT	0	SM	SILTY SAND - Sand, 80%, fine-grained, well sorted, subrounded, light gray, and frosted.		
	2	SM	SILTY SAND - Sand, 80%, fine-grained, well sorted, subrounded, frosted and light to dark brown. Silt, 20%, light to dark brown, semi-dry. Micaceous flakes mixed in. Garbage hit at 2', 1' layer of cemented sand at 8'.		
BEN-TONITE	10	SW	SAND - Sand, 100%, fine-grained, well to moderately well sorted, subrounded, frosted and light to dark brown, semi-dry. Micaceous flakes intermixed. Garbage at 2', 1' layer of cemented sand at 8'.	85320882 JA546 MJA212	Soil Composite
	13	SW			
2" SS CASING					
BEN-TONITE SLURRY				85320883 JA547 MJA213	Soil Composite
	40	SP	SAND - Sand, 100%, coarse- to medium-grained, poorly sorted, subrounded to subangular, frosted, and dusky brown to dark olive gray.		
		SP			
	50				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-2

WELL DETAILS		DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
BENTONITE SLURRY	2" SS CASING	-- 50--				
		-- 60--	SP	GRAVELLY SAND. Gravel - poorly sorted, angular, mostly dark gray to black, some frosted. Water at 65'.		
FINE SAND			SP			
		-- 66				
COARSE AND NATURAL SAND	2" SS 0.010 SLOT SCREEN				85320885 JA572 MJA249	Aqueous grab
	2" SS SUMP	-- 86				
		-- 88--		BOTTOM OF BORING - 88 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: R. Holtz
Date Completed: 8/04/85

Job No: TDD R10-8410-14 **Boring No:** EE-3
Location: 30' West of Area A
Surface Elev: 415.1 ft. **Datum:** AMSL
Casing Elev: 417.2 ft. **Datum:** AMSL
Total Depth: 87 ft. **Datum:** Below TOC
Groundwater: 353.1 ft. AMSL

WELL DETAILS		DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT		0	SM	SILTY SAND. Sand, 80%, fine-grained, well sorted, subrounded to subangular, light gray and opaque, mica granules. Silt, 20%, light gray, dry.		
		2	SM	SAND WITH SILT. Sand, 90%, fine-grained, well sorted, subangular to subrounded, frosted and light to dark brown. Silt, 10%, semi-dry, large amounts of garbage (wood, cans, plastic, etc.) from 3'-17'.		
BEN-TONITE PELLET		10	SW	SAND - Sand, 100%, fine- to medium-grained, moderately well sorted, subangular to angular, dusky yellowish brown and frosted, mica flakes, semi-dry.	85320875 JA560 MJA228	Soil Composite
		15				
	2" SS CASING	17	SW	SAND - Sand, 100%, medium-grained, moderately well sorted, subangular to subrounded, dark olive brown. Trace fine pebbles (4-10mm) at 25' and 38'.		
BEN-TONITE SLURRY					85320876 JA561 MJA229	Soil Composite
		40	SP	GRAVELLY SAND - poorly sorted, angular to sub-angular, dark gray, and frosted, a salt and pepper appearance.		
		50				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-3

WELL DETAILS		DEPTH (FEET)	SYMBOL		LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
BEN-TONITE SLURRY	2" SS CASING	-- 50--		SP	GRAVELLY SAND - Coarse, poorly sorted, sub-rounded to subangular, dark gray to black, and frosted. Gravel approximately 3mm size, small pebbles (10-15mm) at 57', flowing sands at 64'.		
FINE SAND		-- 59					
		-- 64					
COARSE SAND AND NATURAL GRAVEL	2" SS 0.010 SLOT SCREEN					85320881 JA573 MJA248	Aqueous grab
	2" SS SUMP	-- 85					
		-- 87--			TOTAL DEPTH - 87 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: R. Holtz
Date Completed: 7/17/85

Job No: TDD R10-8410-14 Boring No: EE-4
Location: 30' SE of Area 8
Surface Elev: 397.6 ft. Datum: AMSL
Casing Elev: 396.4 ft. Datum: AMSL
Total Depth: 72 ft. Datum: Below TOC
Groundwater: 353.4 ft. AMSL

WELL DETAILS		DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT		-- 0--	SM	SILTY SAND. Sand, 80%, very fine-grained, well sorted, subangular to subrounded, light gray, frosted, and clear. Very dry.		
		-- 2--	SW	SAND - Sand, 100%, fine- to medium-grained, moderately well sorted, subangular, frosted and dark yellowish brown. Feldspar, mica, hornblende, or basalt. Cemented sand 13'-14', increasingly coarser below 14'.	85290825 JA562 MJA231	Soil Composite
		-- 18--	SP	SAND - Sand, 100%, coarse, poorly sorted, sub-angular, medium olive gray, frosted, trace gravel and 5-8mm pebbles.		
BEN-TONITE SLURRY	2" SS CASING	20--	SP	SAND WITH GRAVEL. Sand, 90%, medium- to coarse-grained, moderately poorly to poorly sorted, angular to subangular, dark yellowish brown and frosted. Gravel, 10%, coarse-grained, dark gray or black. Gravel found between 26'-30'.	85290826 JA563 MJA230	Soil Composite
		30--	GP	SANDY GRAVEL - moderately poorly to poorly sorted, angular to subrounded, semi-dry, light to moderate brown, and frosted. Gravel found between 26'-30'.		
		35--	SP	GRAVELLY SAND. Sand - poorly sorted, angular to subangular, olive gray to dark gray, and frosted. Gravel - coarse, subangular, olive gray to dark gray.		
FINE SAND		-- 43				
		45--				
COARSE SAND & NATURAL GRAVEL	2" SS 0.010 SLOT SCREEN	-- 46	GP	GRAVEL - Gravel, 100%, coarse to very coarse, poorly sorted, flowing, dark gray to black and frosted. Trace sand. Trace pebbles and small cobbles at 60'.		
		-- 50--				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-4

WELL DETAILS		DEPTH (FEET)	SYMBOL		LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
COARSE SAND & NATURAL GRAVEL	2" SS 0.010 SLOT SCREEN	-- 50--		GP	GRAVEL - cont'd		
	2" SS SUMP	-- 70				85281029 JA569 MJA234	Aqueous grab
		-- 72--			TOTAL DEPTH - 72 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: R. Holtz
Date Completed: 7/20/85

Job No: TDD R10-8410-14 **Boring No:** EE-5
Location: 30' West of Area B
Surface Elev: 405.5 ft. **Datum:** AMSL
Casing Elev: 407.9 ft. **Datum:** AMSL
Total Depth: 72 ft. **Datum:** Below TOC
Groundwater: 350.9 ft. AMSL

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT	0	SM	SILTY SAND. Sand - 80%, very fine-grained, well sorted, light to medium gray, clear, and frosted. Silt - 20%, light to medium gray, some surface loam.		
	2	SW	SAND - Sand, 100%, very fine- to medium-grained, well to moderately well sorted, subrounded to subangular, frosted and light to dark brown.		
	10	SW	SAND - Sand, 100%, fine- to coarse-grained, well to moderately well sorted, subrounded to angular, frosty and clear, also dark olive brown, semi-dry.	85290827 JA565 MJA232	Soil Composite
BEN-TONITE	12.5				
	14				
2" SS CASING	20	SP	SAND - Sand, 100%, fine- to coarse-grained, poorly to moderately poorly sorted, subangular, dark olive gray, becomes coarser and olive gray below 35'. Granules and small pebbles (6-16mm) at 38', semi-dry.	85290828 JA566 MJA233	Soil Composite
BEN-TONITE SLURRY					
FINE SAND	40	GP	GRAVEL - Gravel, 100%, coarse, poorly sorted, angular to subangular, dark gray to black, and frosted.		
	42				
COARSE SAND AND NATURAL PACK	50				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-5

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
	-- 50--	GP	SAND AND GRAVEL - coarse to very coarse, angular to subangular, dark gray to black, and frosted.		
COARSE SAND AND GRAVEL PACK 2" SS 0.010 SLOT SCREEN	57--	GP	GRAVEL WITH SAND. Gravel - 90%, very coarse, poorly sorted, angular. Sand, 10%, coarse-grained, subrounded. Trace pebbles and cobbles. Saturated.		
2" SS SUMP	-- 69			85281030 JA570 MJA238 (MJA235)	Aqueous grab
	-- 72				
	-- 75		TOTAL DEPTH - 75 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: Randy Holtz/Jim Braddock
Date Completed: 7/31/85

Job No: TDD R10-8410-14 **Boring No:** EE-6
Location: 30' Southwest of Area C-D
Surface Elev: 424.9 ft. **Datum:** AMSL
Casing Elev: 427.0 ft. **Datum:** AMSL
Total Depth: 102 ft. **Datum:** Below TOC
Groundwater: 352.4 ft. AMSL

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT	0	SM	SILTY SAND - Well sorted, light to medium gray, frosted, and transparent. Mostly quartz, dry. SAND with SILT. Sand, fine- to very fine-grained, well sorted, light to medium brown. Most silt found 2'-5'.		
	2	SW			
	10	SW	SAND - Sand, 100%, fine- to coarse-grained, well to moderately well sorted, subrounded to subangular, frosted, to dark yellowish to olive brown; occasional layers, 4-6 mm pebbles in lower part.	85290827 JA565 MJA232	Soil Composite
BEN-TONITE	12				
	14				
2" SS CASING					
BEN-TONITE				853 10395 JA553 MJA219	Soil Composite
	40	SP	SAND - Sand, 100%, coarse- to medium-grained, moderately poorly to poorly sorted, subangular to angular, frosted to dark olive gray; moist.		
	50				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE6

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
BEN-TONITE SLURRY; 2"SS CASING	-- 50--	GC	SANDY GRAVEL with CLAY - Gravel, coarse to very coarse, subangular, dark gray to black. Sand, coarse, poorly sorted, subangular to subrounded, frosted and dark olive gray. Clay, silty clay in occasional seams, small granules and pebbles at 58'.		
	57--	SP	GRAVELLY SAND with PEBBLES - Sand, coarse-grained, poorly sorted, subangular to angular dark gray to black, and frosted. Pebbles - 10-20mm.		
FINE SAND	-- 70				
	-- 72				
	75--	GP	GRAVEL with SAND - Sand, very coarse-grained, very poorly sorted, angular, dark gray to black, and frosted, salt and pepper appearance.		
	-- 80				
COARSE SAND AND GRAVEL TO 102'; 2"SS 0.010 SLOT SCREEN					
	--100			85320878 JA575 MJA227	Aqueous grab
2" SS SUMP	--102--		TOTAL DEPTH - 102 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: Randy Holtz/Jim Braddock
Date Completed: 7/29/85

Job No: TDD R10-8410-14 **Boring No:** EE-7
Location: 30' West of Area C
Surface Elev: 423.8 ft. **Datum:** AMSL
Casing Elev: 425.6 ft. **Datum:** AMSL
Total Depth: 100 ft. **Datum:** Below TOC
Groundwater: 351.9 ft. AMSL

WELL DETAILS		DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT		0	SM	SILTY SAND - Sand, well sorted, subrounded, light gray, frosted and clear; surficial loam and debris present.		
		2	SM	SILTY SAND - Sand, fine- to very fine-grained, well to moderately well sorted, subangular, light to medium brown, and frosted. Fill material (old car parts, glass, wood, etc.) between 6'-9'.		
BEN-TONITE		10				
		11	SW	SAND - Sand, 100%, fine- to medium-grained, moderately well sorted, subangular to sub-rounded, mostly frosted quartz, some dark to moderate olive brown, 1-2mm granules at 14', micaeous flakes at 16'.	85310392 JA557 MJA224	Soil Composite
		20	SW	SAND - Sand, 100%, medium- to fine-grained, moderately well sorted, subangular to sub-rounded. Mostly frosted, some dark to moderate olive brown.		
BEN-TONITE SLURRY	2" SS CASING					
					85310393 JA558 MJA225	Soil Composite
		40	GP	SANDY GRAVEL - Sand, medium- to coarse-grained, poorly sorted, subangular to subrounded, cloudy, and grayish olive brown.		
		50				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-7

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
BEN-TONITE SLURRY; 2" SS CASING	-- 50--	GP	SANDY GRAVEL (continued)		
FINE SAND	-- 70--	SP	GRAVELLY SAND - Sand, poorly sorted, subangular to subrounded, dark gray to black, and frosted quartz. Salt and pepper appearance. Pebbles and cobbles at 66', flowing sands at 76'.		
	-- 72--				
COARSE SAND AND NATURAL GRAVEL	-- 78				
2" SS 0.010 SLOT SCREEN	-- 98			85320879 JA576 MJA237	Aqueous grab
2" SS SUMP	--100--		TOTAL DEPTH - 100 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: Randy Holtz/Jim Braddock
Date Completed: 7/23/85

Job No: TDD R10-8410-14 Boring No: EE-8
Location: 30' Southeast of Area E
Surface Elev: 426.5 ft. Datum: AMSL
Casing Elev: 428.4 ft. Datum: AMSL
Total Depth: 100 ft. Datum: Below TOC
Groundwater: 351.8 ft. AMSL

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT	0	SM	SILTY SAND - Sand, very fine-grained, well sorted, light to medium gray, and frosted. Dry, mica flakes, some surficial loam mixed in.		
	2	SW	SAND with SILT. Sand - fine-grained, well to moderately well sorted, subrounded to subrounded to subangular, frosted and moderate olive brown. Small pebbles at 7'.		
	10	SW	SAND - Sand, 100%, fine- to medium-grained, well to moderately well sorted, subangular to subrounded, frosted to moderate olive brown. Becomes more coarse below 18'.	85300850 JA548 MJA214	Soil Composite
BEN-TONITE	13				
2" SS CASING	15				
BEN-TONITE SLURRY	20	SW	SAND - Sand, 100%, fine- to medium-grained, well to moderately well sorted, angular to subangular, frosted to olive brown. Occasional 1'-2' lenses of cemented sand; small pebble layers at 35', 47' and 50'. Becomes coarser at 49'.		
				85300851 JA549 MJA215	Soil Composite
	50				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-8

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
BEN-TONITE SLURRY	-- 50--	GP	SANDY GRAVEL - Gravel, poorly sorted, subangular to subrounded, dark grayish brown to black frosted. Pebbles (10-20mm) at 54'.		
FINE SAND	-- 54				
	-- 57				
COARSE SAND	70--	SP	GRAVELLY SAND - Sand, poorly sorted, subangular to angular gravel and subrounded sand, dusky yellowish brown to grayish black.		
2" SS CASING	-- 78				
2" SS 0.010 SLOT SCREEN	-- 98			85310391 JA574 MJA223	Aqueous grab
2" SS SUMP	--100--		TOTAL DEPTH - 100 ft.		

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 1 of 2

Project: Resource Recovery
Boring Contr.: Boyles Bros.
Boring Method: Hollow Stem Auger
Logged by: Randy Holtz/Jim Braddock
Date Completed: 7/25/85

Job No: TDD R10-8410-14 **Boring No:** EE-9
Location: 30' Southeast of Area E
Surface Elev: 426.2 ft. **Datum:** AMSL
Casing Elev: 424.8 ft. **Datum:** AMSL
Total Depth: 97 ft. **Datum:** Below TOC
Groundwater: 352.7 ft. AMSL

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
CEMENT	0	SM	SILTY SAND - Sand, fine- to very fine-grained, well sorted, subrounded to subangular, light to medium gray, clear and frosted.		
	2	SW	SAND - Sand, 100%, fine- to medium-grained, well to moderately well sorted, subangular to angular, light to dark brown. Large pebbles and fill material 8'-10'.		
BEN-TONITE PELLET	10	SW	SAND - Sand, 100%, fine- to medium-grained, moderately well to well sorted, subangular to subrounded, mostly frosted, also dark to moderate olive brown. Large mica flakes; pebbles (4-10mm) at 18'. Occasional cemented sand.	85300852 JA550 MJA216	Soil Composite
	12				
2" SS CASING					
BEN-TONITE SLURRY					
	30	SP	SAND - Sand, 100%, medium-grained, poorly sorted, frosted to moderate olive brown. Extensive cemented sand at 35' and 44'.	85310853 JA551 MJA217	Soil Composite
	50				

ecology and environment, inc. DRILLING AND SAMPLE LOG Sheet 2 of 2

Project: Resource Recovery Job No: R10-8410-14 Boring No: EE-9

WELL DETAILS	DEPTH (FEET)	SYMBOL	LITHOLOGICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE
BENTONITE SLURRY	-- 50--	SP	SAND with GRAVEL - Sand, coarse-grained, poorly sorted, subrounded, dark gray and frosted; gravel, very well sorted, subrounded. Small pebbles (5-8mm) at 55', becomes coarser below 58'.		
FINE SAND	-- 52				
	-- 54				
	61--		SANDY GRAVEL - Gravel, poorly sorted, subangular, dark gray to black, frosted.		
2" SS CASING		GP			
	63--		GRAVELLY SAND - Sand, poorly sorted, angular, dark gray to black, saturated. Gravel - very well sorted. Cobbles and pebbles 85'-100'.		
COARSE SAND AND NATURAL GRAVEL		SP			
	70--		GRAVELLY SAND - Sand, poorly sorted, subangular to angular gravel and subrounded sand, dusky yellowish brown to grayish black.		
		SP			
	-- 75				
2" SS 0.010 SLOT SCREEN					
	-- 95				
2" SS SUMP					
	-- 97--		TOTAL DEPTH - 97 ft.	85310390 JA572 MJA222	Aqueous grab

ecology and environment, inc.

DRILLING
WEEKLY PROGRESS REPORT

Work Site: Resource Recovery Corp. E & E Job No.: R-20-8410-14 ~~Week~~ Ending: 8/6/85

Driller: W. Franklin Driller's Helper: K. Jones/A. Aronson Geologist: R. Holtz

Number of Drill Holes Drilled and Completed: 11 days = 951 feet Average Feet/Day: 86.4/day

Drill Hole Information:

1. Hole Designation: EE-1-A Total Depth: 23' Static Water Level: N/A

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? N Type and Amount of Casing Used: N/A Screened Interval: N/A

7/16/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

Amount of Sand, Gravel or Cement Used: N/A

Was Hole Developed? No

Problems Encountered: Large cobbles and boulders encountered causing augers to bind. Hole was abandoned.

2. Hole Designation: EE-1-B Total Depth: 43' Static Water Level: N/A

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? N Type and Amount of Casing Used: N/A Screened Interval: N/A

Type and Size of Well Screen: Johnson Stainless Steel .01 slot size.

7/16/85 Amount of Sand, Gravel or Cement Used: N/A

Was Hole Developed? No

Problems Encountered: Large Cobles and boulders encountered, hole abandoned, move to Area B

3. Hole Designation: EE-4 Total Depth: 72' Static Water Level: 43.5'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? Y Type and Amount of Casing Used: S.S. 52' Screened Interval: 48-70'

Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

7/17/85 Amount of Sand, Gravel or Cement Used: 30' coarse sand, fine 25' bentonite, 17 cement

Was Hole Developed? Y, 30 gallons purged out on 7/21/85

Problems Encountered: Flowing sands causing problems with installation of casing.

Randall S. Ott 8/30/85
Signature/Date

*11 days actual drilling - other days spend decontamination

cc: V.P. Technical Services, Project Director, Project Manager, Project File

448025

ecology and environment, inc.

DRILLING
WEEKLY PROGRESS REPORT

Work Site: Resource Recovery Corp. E & E Job No.: R-20-8410-14 ~~Week~~ Ending: 8/6/85

Driller: W. Franklin Driller's Helper: K. Jones/A. Aronson Geologist: R. Holtz

Number of Drill Holes Drilled and Completed: 11 days = 951' Average Feet/Day: 86.4'/day

Drill Hole Information:

1. Hole Designation: EE-5-A Total Depth: 78' Static Water Level: 52.25'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? Y Type and Amount of Casing Used: S.S. 58' Screened Interval: 56.25'

7/19/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

Amount of Sand, Gravel or Cement Used: 30' coarse & fine sand. 2' bentonite pellets

Was Hole Developed? No

Problems Encountered: Sand had flowed up inside the augers and when pellets were introduced they seized the casing to the augers. Hole abandone.

2. Hole Designation: EE-5-B Total Depth: 72' Static Water Level: 51'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? Y Type and Amount of Casing Used: S.S. 52' Screened Interval: 50-72'

7/20/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size.

Amount of Sand, Gravel or Cement Used: 32' coarse, find sand 28' bentonite 12' grout.

Was Hole Developed? Yes on 7/21 - 30 gallons purged out.

Problems Encountered: Flowing sands causing some minor problems with casing installation

3. Hole Designation: EE-8 Total Depth: 103' Static Water Level: 77.4'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

7/23/85 Was Hole Cased? Y Type and Amount of Casing Used: S.S. 80' Screened Interval: 78-100'

Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

Amount of Sand, Gravel or Cement Used: 50' sand (coarse, fine) 38' bentonite, 12' grout

Was Hole Developed? Yes. 24.8 gallons purged on 7/24/85.

Problems Encountered: Casing rose about 3' at beginning of auger withdrawl, but after sand pack was in, no more rose up.

Randall S. Olsen 8/30/85
Signature/Date

cc: V.P. Technical Services, Project Director, Project Manager, Project File

448025

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DRILLING
WEEKLY PROGRESS REPORT

Work Site: Resource Recovery Corp. E & E Job No.: R-20-8410-14 Week Ending: 8/6/85

Driller: W. Franklin Driller's Helper: K. Jones/A. Aronson Geologist: R. Holtz

Number of Drill Holes Drilled and Completed: 11 days = 951 feet Average Feet/Day: 86.4/day

Drill Hole Information:

1. Hole Designation: EE-9 Total Depth: 97' Static Water Level: 75'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

7/25/85 Was Hole Cased? Y Type and Amount of Casing Used: S.S. 75' Screened Interval: 75-97'

Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

Amount of Sand, Gravel or Cement Used: 33' coarse & fine sand, 54' bentonite, 10' grout

Was Hole Developed? Yes. 24.5 gallons purged on 7/30/85

Problems Encountered: Flowing sand causing some problems with casing installation.

2. Hole Designation: EE-7 Total Depth: 100' Static Water Level: 73.2'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? Y Type and Amount of Casing Used: S.S. 80' Screened Interval: 78-100'

7/29/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size.

Amount of Sand, Gravel or Cement Used: 30' sand coarse & fine, 60' bentonite, 10' grout

Was Hole Developed? Yes. 30 gallons purged 7/30/85

Problems Encountered: Some debris at beginning of hole but no major difficulties encluntered

3. Hole Designation: EE-6 Total Depth: 100' Static Water Level: 70.3

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? ____ Type and Amount of Casing Used: S.S. 80' Screened Interval: 77.5 to 99.5'

7/31/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

Amount of Sand, Gravel or Cement Used: 30' coarse and find sand, 58' bentonite, 12' grout

Was Hole Developed? Yes. 24.5 gallons purged on 8/2/85

Problems Encountered: Flowing sands caused casing to be set at 99.5 instead of 102'.

Randall S. Arvey 8/30/85
Signature/Date

cc: V.P. Technical Services, Project Director, Project Manager, Project File

448025

ecology and environment, inc.

DRILLING
WEEKLY PROGRESS REPORT

Work Site: Resource Recovery Corp. E & E Job No.: R-20-8410-14 Week Ending: 8/6/85

Driller: W. Franklin Driller's Helper: K. Jones/A. Aronson Geologist: R. Holtz

Number of Drill Holes Drilled and Completed: 11 days = 951 feet Average Feet/Day: 86.4/day

Drill Hole Information:

1. Hole Designation: EE-1 Total Depth: 88' Static Water Level: 59.2'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? Y Type and Amount of Casing Used: S.S. 69' Screened Interval: 66-88'

8/2/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

Amount of Sand, Gravel or Cement Used: 43' sand (coarse & fine), 35' bentonite, 10' grout

Was Hole Developed? Yes. 28 gallons purged on 8/3/85

Problems Encountered: No probelms at all

2. Hole Designation: EE-3 Total Depth: 87' Static Water Level: 62'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? Y Type and Amount of Casing Used: S.S. 67' Screened Interval: 65-87'

8/4/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size.

Amount of Sand, Gravel or Cement Used: 27' coarse & fine sand. 48' bentonite, 12' grout

Was Hole Developed? Yes. 28 gallons purged out on 8/6/85

Problems Encountered: High Hnu readings caused us to wear PAPRs throughout the entire hole.

3. Hole Designation: EE-2 Total Depth: 86' Static Water Level: 68.5'

How Hole was Drilled and Equipment Used: Mobile B-80 rig with 4" hollow stem augers.

Was Hole Cased? Y Type and Amount of Casing Used: 66' Screened Interval: 64-86'

8/6/85 Type and Size of Well Screen: Johnson Stainless Steel .01 slot size

Amount of Sand, Gravel or Cement Used: 26' sand (coarse & fine) 50' bentonite, 10' grout

Was Hole Developed? Yes. 28.2 gallons purged on 8/6/85

Problems Encountered: No problems at all.

Randall S. Hess 8/30/85
Signature/Date

cc: V.P. Technical Services, Project Director, Project Manager, Project File

448025

APPENDIX C

SAMPLE DOCUMENTATION SUMMARY

SITE NAME: RESOURCE RECOVERY
CASE NO. 4679

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
W1	85281002	7/10/85	Aqueous Grab	0.2 ppb	463973090	7/10/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
W1	JA536	7/10/85	Aqueous Grab	Varies	463973086	7/10/85 1600	2 40-ml vials 4 1-liter amber	Rock Mountain/ Organic	Vial Lot #24292122 Amber Lot #85172222
W1	MJA203	7/10/85	Aqueous Grab	Varies	463973016	7/10/85 1600	1 1-liter poly	California Analytical/ Inorganic	Lot #35157312
W2	85281003	7/10/85	Same	0.2 ppb	463973090	7/10/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
W2	JA538	7/10/85	Same	Varies	463973086	7/10/85 1600	2 40-ml vials 4 1-liter amber	Rocky Mountain/ Organic	Vial Lot #24292122 Amber Lot #85172222
W2	MJA205	7/10/85	Same	Varies	463973042	7/10/85 1600	1 1-liter poly	California Analytical/ Inorganic	Lot #35157312
W3	85281001	7/09/85	Same	0.2 ppb	463973101	7/09/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
W3	JA533	7/09/85	Same	Varies	463973123	7/09/85 1600	2 40-ml vials 4 1-liter amber	Rocky Mountain/ Organic	Vial Lot #24292122 Amber Lot #85172222
W3	MJA202	7/09/85	Same	Varies	463973112	7/09/85 1600	1 1-liter poly	California Analytical/ Inorganic	Lot #35157312
W4	85281004	7/11/85	Aqueous Grab	0.2 ppb	463973031	7/11/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
W4	JA539	7/11/85	Aqueous Grab	Varies	463973042	7/11/85 1600	2 40-ml vials 4 1-liter amber	Rocky Mountain/ Organic	Vial Lot #24292122 Amber Lot #85172222
W4	MJA206	7/11/85	Aqueous Grab	Varies	463973053	7/11/85 1600	1 1-liter poly	California Analytical/ Inorganic	Lot #35157312

SITE NAME: RESOURCE RECOVERY
CASE NO. 4679

IDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
W5	85281005	7/11/85 1155	Aqueous Grab	0.2 ppb	463973031	7/11/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
W5	JA540	7/11/85 1155	Same	Varies	463973042	7/11/85 1600	2 40-ml vials 4 1-liter amber	Rocky Mountain/ Organic	Vial Lot #24292122 Amber Lot #85172222
W5	MJA207	7/11/85 1155	Same	Varies	463973053	7/11/85 1600	1 1-liter poly	California Analytical Inorganic	Lot #35157312
DWW	85281006	7/11/85 1116	Same	0.2 ppb	463973031	7/11/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
DWW	JA541	7/11/85 1166	Same	Varies	463973042	7/11/85 1600	2 40-ml vials 4 1-liter amber	Rocky Mountain/ Organic	Vial Lot #24292122 Amber Lot #85172222
DWW	MJA208	7/11/85 1116	Same	Varies	463973053	7/11/85 1600	1 1-liter poly	California Analytical Inorganic	Lot #35157312
BRS-01	85281000	7/09/85 0800	Same	0.2 ppb	463973101	7/09/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
BRS-01	JA534	7/09/85 0800	Same	Varies	463973123	7/09/85 1600	2 40-ml vials 4 1-liter amber	Rocky Mountain/ Organic	Vial Lot #24292122 Amber Lot #85172222
BRS-01	MJA201	7/09/85 0800	Same	Varies	463973112	7/09/85 1600	1 1-liter poly	California Analytical/ Inorganic	Lot #35157312
TP-01	JA534	7/09/85 0845	Aqueous	Varies	46373123	7/09/85 1600	2 40-ml vials	Rocky Mountain/ VOA	Lot #24292122
TP-02	JA537	7/10/85 1425	Aqueous	Varies	463973086	7/10/85 1600	2 40-ml vials	Rocky Mountain/ VOA	Lot #24292122
TP-03	JA542	7/11/85 1430	Aqueous	Varies	463973042	7/11/85 1600	2 40-ml vials	Rocky Mountain/ VOA	Lot #24292122

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
TP-04	JA578	7/22/85 1350	Aqueous	Varies	129006684	7/22/85 1600	2 40-ml vials	Rocky Mountain/ VOA	Lot #24292122
TP-05	JA568	8/01/85 1400	Aqueous	Varies	129006754	8/01/85 1600	2 40-ml vials	A.T.I./VOA	Lot #24292122
TP-06	JA338	8/05/85 1400	Aqueous	Varies	129006625	8/05/85 1530	2 40-ml vials	Rocky Mountain/ VOA	Lot #24292122
TP-07	JA302	8/07/85 0900	Aqueous	Varies	155009260	8/07/85 1500	2 40-ml vials	A.T.I./VOA	Lot #24292122
Auger Rinsate	85320884	8/07/85 1230	Aqueous	0.2 ppb	463973974	8/07/85 1500	2 1-liter amber	EPA Lab/Pesticides	Lot #85175162
Auger Rinsate	JA303	8/07/85 1230	Aqueous	Varies	155009260	8/07/85 1500	4 1-liter amber 2 40-ml vials	A.T.I./Organic	Vial Lot #24292122 Amber Lot #85175162
Auger Rinsate	MJA236	8/07/85 1230	Aqueous	Varies	463973020	8/07/85 1500	1 1-liter poly	California Analytical/ Inorganic	Lot #35157312
Transfer Blank for lot #85175102	85320880	8/07/85 0900	Aqueous	0.2 ppb	463973974	8/07/85 1500	2 1-liter amber	EPA Lab/Pesticides	Lot #85175162
Transfer Blank	JA301	8/07/85 1300	Aqueous	Varies	155009260	8/07/85 1500	4 1-liter amber	A.T.I./Organics	Lot #85175162
EE-1	85320877	8/05/85 1040	Aqueous Grab	0.2 ppb	129006636	8/05/85 1530	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-1	JA554	8/05/85 1040	Aqueous Grab	Varies	129006625	8/05/85 1530	2 40-ml vials 4 1-liter amber	A.T.I./Organics	Vial Lot #25292122
EE-1	MJA221	8/05/85 1040	Aqueous Grab	Varies	129006640	8/05/85 1530	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
EE-2	85320885	8/07/85 0930	Aqueous Grab	0.2 ppb	463973974	8/07/85 1500	2 1-liter amber	EPA Lab/Pesticides	
EE-2	JA572	8/07/85 0930	Aqueous Grab	Varies	155009260	8/07/85 1500	2 40-ml vials 4 1-liter amber	A.T.I./Organics	Vial Lot #24292122 Lot #85172222
EE-2	MJA249	8/07/85 0930	Aqueous Grab	Varies	463973020	8/07/85 1500	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312
EE-3	85320881	8/07/85 1000	Aqueous Grab	0.2 ppb	85320881	8/07/85 1500	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-3	JA573	8/07/85 1000	Aqueous Grab	Varies	155009260	8/07/85 1500	2 40-ml vials 4 1-liter amber	A.T.I./Organics	Vial Lot #24292122 Amber Lot #85172222
EE-3	MJA248	8/07/85 1000	Aqueous Grab	Varies	463973020	8/07/85 1500	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312
EE-4	85281029	7/22/85 1415	Aqueous Grab	0.2 ppb	129006732	7/22/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-4	JA569	7/22/85 1415	Aqueous Grab	Varies	129006684	7/22/85 1600	2 40-ml vials 4 1-liter amber	A.T.I./Organics	Vial Lot #24292122 Amber Lot #85172222
EE-4	MJA234	7/22/85 1415	Aqueous Grab	Varies	129006743	7/22/85 1600	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312
EE-5	85281030	7/22/85 1500	Aqueous Grab	0.2 ppb	129006732	7/22/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-5	JA570	7/22/85 1500	Aqueous Grab	Varies	129006684	7/22/85 1600	2 40-ml vials 4 1-liter amber	A.T.I./Organics	Vial Lot #24292122 Amber Lot #85172222
EE-5	MJA238 (MJA235)	7/22/85 1500	Aqueous Grab	Varies	129006743	7/22/85 1600	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
EE-6	85320878	8/05/85 0930	Aqueous Grab	0.2 ppb	129006636	8/05/85 1530	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-6	JA575	8/05/85 0930	Aqueous Grab	Varies	129006625	8/05/85 1530	2 40-ml vials 4 1-liter amber	A.I.I./Organics	Vial Lot #24292122 Amber Lot #85172222
EE-6	MJA227	8/05/85 0930	Aqueous Grab	Varies	129006640	8/05/85 1530	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312
EE-7	85320879	8/05/85 0830	Same	0.2 ppb	129006636	8/05/85 1530	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-7	JA576	8/05/85 0830	Same	Varies	129006625	8/05/85 1530	2 40-ml vials 4 1-liter amber	A.I.I./Organics	Vial Lot #24292122 Amber Lot #85172222
EE-7	MJA237	8/05/85 0830	Same	Varies	129006640	8/05/85 1530	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312
EE-8	85310391	8/01/85 1130	Same	0.2 ppb	129006695	8/01/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-8	JA574	8/01/85 1130	Same	Varies	129006754	8/01/85 1600	2 40-ml vials	EPA Lab/Pesticides	Vial Lot #24292122
EE-8	MJA223	8/01/85 1130	Same	Varies	129006706	8/01/85 1600	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312
EE-9	85310390	8/01/85 1400	Aqueous Grab	0.2 ppb	129006695	8/01/85 1600	2 1-liter amber	EPA Lab/Pesticides	Lot #85172222
EE-9	JA571	8/01/85 1400	Aqueous Grab	Varies	129006754	8/01/85 1600	2 40-ml vials 4 1-liter amber	A.I.I./Organics	Vial Lot #24292122 Amber Lot #85172222
EE-9	MJA222	8/01/85 1400	Aqueous Grab	Varies	129006706	8/01/85 1600	1 1-liter poly	California Analytical/ Inorganics	Lot #35157312

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
EE-1 10-30 ft.	85310396	8/02/85 0810	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-1 10-30 ft.	JA544	8/02/85 0810	Soil Composite	Varies	12900651	8/05/85 1600	8 oz. glass jar	EAL/Organics	
EE-1 10-30 ft.	MJA210	8/02/85 0810	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-1 30-gw	85310397	8/02/85 1030	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-1 30-gw	JA545	8/02/85 1030	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-1 30-gw	MJA211	8/02/85 1030	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-2 10-30 ft.	85320882	8/06/85 0800	Soil Composite	0.2 ppb	463973974	8/07/85 1500	8 oz. glass jar	EPA Lab/Pesticides	
EE-2 10-30 ft.	JA546	8/06/85 0800	Soil Composite	Varies	155009271	8/07/85 1500	8 oz. glass jar	EAL/Organics	
EE-2 10-30 ft.	MJA212	8/06/85 0800	Soil Composite	Varies	463973020	8/07/85 1500	8 oz. glass jar	California Analytical/ Inorganics	
EE-2 30-gw	85320883	8/06/85 1015	Soil Composite	0.2 ppb	463973974	8/07/85 1500	8 oz. glass jar	EPA Lab/Pesticides	
EE-2 30-gw	JA547	8/06/85 1015	Soil Composite	Varies	155009271	8/07/85 1500	8 oz. glass jar	EAL/Organics	
EE-2 30-gw	MJA213	8/06/85 1015	Soil Composite	Varies	463973020	8/07/85 1500	8 oz. glass jar	California Analytical/ Inorganics	

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
EE-3 10-30 ft.		8/07/85 0930	Soil Composite	0.2 ppb			8 oz. glass jar	EPA Lab/Pesticides	
EE-3 10-30 ft.	JA560	8/07/85 0930	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-3 10-30 ft.	MJA228	8/07/85 0930	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-3 30-gw		8/07/85 1030	Soil Composite	0.2 ppb			8 oz. glass jar	EPA Lab/Pesticides	
EE-3 30-gw	JA561	8/07/85 1030	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-3 30-gw	MJA229	8/07/85 1030	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-4 10-20 ft.	85290825	7/17/85 1340	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-4 10-20 ft.	JA562	7/17/85 1340	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-4 10-20 ft.	MJA231	7/17/85 1340	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-4 20-gw	85290826	7/17/85 1615	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-4 20-gw	JA563	7/17/85 1615	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-4 20-gw	MJA230	7/17/85 1615	Soil Composite	Varies	129006640	8/85/85 1530	8 oz. glass jar	California Analytical/ Inorganics	

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
EE-5 10-20 ft.	85290827	7/19/85 1340	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-5 10-20 ft.	JA565	7/19/85 1340	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-5 10-20 ft.	MJA232	7/19/85 1340	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-5 20-gw	85290828	7/19/85 1615	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-5 20-gw	JA566	7/19/85 1615	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-5 20-gw	MJA233	7/19/85 1615	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-6 10-30 ft.	85310394	7/31/85 0920	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-6 10-30 ft.	JA552	7/31/85 0920	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-6 10-30 ft.	MJA218	7/31/85 0920	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-6 30-gw	85310395	7/31/85 1145	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-6 30-gw	JA553	7/31/85 1145	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-6 30-gw	MJA219	7/31/85 1145	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
EE-7 10-30 ft.	85310392	7/29/85 0935	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-7 10-30 ft.	JA557	7/29/85 0935	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-7 10-30 ft.	MJA224	7/29/85 0935	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-7 30-gw	85310393	7/29/85 1150	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-7 30-gw	JA558	7/29/85 1150	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-7 30-gw	MJA225	7/29/85 1150	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-8 10-30 ft.	85300850	7/23/85 1045	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-8 10-30 ft.	JA548	7/23/85 1045	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-8 10-30 ft.	MJA214	7/23/85 1045	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-8 30-gw	85300851	7/23/85 1230	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-8 30-gw	JA549	7/23/85 1230	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-8 30-gw	MJA215	7/23/85 1230	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	

SITE NAME: RESOURCE RECOVERY
CASE NO. 4768

TDD NO. : R10-8410-14
PROJECT CODE: TCE-2394
ACCOUNT NO. : TGB-10-PUZZ

Location Number (RRC-)	Sample Number	Date/Time Collected	Matrix/Grab or Composite	Detection Limit	Federal Express Air Bill Number	Date/Time Shipped	Sample Containers	Destination/ Analysis	Remarks
EE-9 10-30 ft.	85300852	7/25/85 0845	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-9 10-30 ft.	JA550	7/25/85 0845	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-9 10-30 ft.	MJA216	8/25/85 0845	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	
EE-9 30-gw	85310853	7/25/85 1100	Soil Composite	0.2 ppb	129006603	8/02/85 1600	8 oz. glass jar	EPA Lab/Pesticides	
EE-9 30-gw	JA551	7/25/85 1100	Soil Composite	Varies	129006651	8/05/85 1530	8 oz. glass jar	EAL/Organics	
EE-9 30-gw	MJA217	7/25/85 1100	Soil Composite	Varies	129006640	8/05/85 1530	8 oz. glass jar	California Analytical/ Inorganics	

APPENDIX D

ANALYTICAL REQUIREMENTS
EPA HAZARDOUS SUBSTANCE LIST

ANALYTICAL REQUIREMENTS

Analytical methods and data quality from contract laboratories is described in detail in IFB WA 84-A266, Chemical Analytical Services for Organics, and IFB WA 84-J091, Chemical Analytical Services for Inorganics. All contract laboratories were required to conform to these standards. Herbicide analyses were conducted using EPA approved extraction, analytical and quality assurance techniques, e.g. Standard Methods for the Examination of Water and Wastewater, 15th Edition, Method 509B (Chlorinated Phenoxy Acid Herbicides). Identification and quantification of herbicides was to be confirmed using two different chromatography columns.

TABLE D-1
ORGANICS ANALYSES
Hazardous Substance List (HSL) and
Contract Required Detection Limits (CRDL) *

	Compound	Detection Limits Low Water [a] (ug/l)	Low Soil/Sediment [b] (ug/kg)
	VOLATILES		
1.	Chloromethane	10	10
2.	Bromomethane	10	10
3.	Vinyl Chloride	10	10
4.	Chloroethane	10	10
5.	Methylene Chloride	5	5
6.	Acetone	10	10
7.	Carbon Disulfide	5	5
8.	1,1-Dichloroethene	5	5
9.	1,1-Dichloroethane	5	5
10.	trans-1.2-Dichloroethene	5	5
11.	Chloroform	5	5
12.	1,2-Dichloroethane	5	5
13.	2-Butanone	10	10
14.	1,1,1-Trichloroethane	5	5
15.	Carbon Tetrachloride	5	5
16.	Vinyl Acetate	10	10
17.	Bromodichloromethane	5	5
18.	1,1,2,2-Tetrachloroethane	5	5
19.	1,2-Dichloropropane	5	5
20.	trans-1,3-Dichloropropene	5	5
21.	Trichloroethene	5	5
22.	Dibromochloromethane	5	5
23.	1,1,2-Trichloroethane	5	5
24.	Benzene	5	5
25.	cis-1,3-Dichloropropene	5	5
26.	2-Chloroethyl Vinyl Ether	10	10
27.	Bromoform	5	5
28.	2-Hexanone	10	10
29.	4-Methyl-2-pentanone	10	10
30.	Tetrachloroethene	5	5
31.	Toluene	5	5
32.	Chlorobenzene	5	5
33.	Ethyl Benzene	5	5
34.	Styrene	5	5
35.	Total Xylenes	5	5

TABLE D-1 (CONT.)

Compound	Detection Limits Low Water [c] (ug/l)	Low Soil/Sediment [d] (ug/kg)
EXTRACTABLE ORGANICS		
1. N-Nitrosodimethylamine	10	330
2. Phenol	10	330
3. Aniline	10	330
4. bis(2-Chloroethyl) Ether	10	330
5. 2-Chlorophenol	10	330
6. 1,3-Dichlorobenzene	10	330
7. 1,4-Dichlorobenzene	10	330
8. Benzyl Alcohol	10	330
9. 1,2-Dichlorobenzene	10	330
10. 2-Methylphenol	10	330
11. bis(2-Chloroisopropyl) Ether	10	330
12. 4-Methylphenol	10	330
13. N-Nitroso-dipropylamine	10	330
14. Hexachloroethane	10	330
15. Nitrobenzene	10	330
16. Isophorone	10	330
17. 2-Nitrophenol	10	330
18. 2,4-Dimethylphenol	10	330
19. Benzoic Acid	50	330
20. bis(2-Chloroethoxy)methane	10	1600
21. 2,4-Dichlorophenol	10	330
22. 1,2,4-Trichlorobenzene	10	330
23. Naphthalene	10	330
24. 4-Chloroanaline	10	330
25. Hexachlorobutadiene	10	330
26. 4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10	330
27. 2-Methylnaphthalene	10	330
28. Hexachlorocyclopentadiene	10	330
29. 2,4,6-Trichlorophenol	10	330
30. 2,4,5-Trichlorophenol	50	1600
31. 2-Chloronaphthalene	10	330
32. 2-Nitroanaline	50	1600
33. Dimethyl Phthalate	10	330
34. Acenaphthylene	10	330
35. 3-Nitroaniline	50	1600

TABLE D-1 (CONT.)

	Compound	Detection Limits Low Water [c] (ug/l)	Low Soil/Sediment [d] (ug/kg)
	EXTRACTABLE ORGANICS (cont.)		
36.	Acenaphthene	10	330
37.	2,4-Dinitrophenol	50	1600
38.	4-Nitrophenol	50	1600
39.	Dibenzofuran	10	330
40.	2,4-Dinitrotoluene	10	330
41.	2,6-Dinitrotoluene	10	330
42.	Diethylphthalate	10	330
43.	4-Chlorophenyl Phenyl Ether	10	330
44.	Fluorene	10	330
45.	4-Nitroaniline	50	1600
46.	4,6-Dinitro-2-methylphenol	50	1600
47.	N-nitrosdiphenylamine	10	330
48.	4-Bromophenyl Phenyl Ether	10	330
49.	Hexachlorobenzene	10	330
50.	Pentachlorophenol	50	1600
51.	Phenathrene	10	330
52.	Anthracene	10	330
53.	Di-n-butylphthalate	10	330
54.	Fluoranthene	10	330
55.	Benzidine	50	1600
56.	Pyrene	10	330
57.	Butyl Benzyl Phthalate	10	330
58.	3,3'-Dichlorobenzidine	20	660
59.	Benzo(a)anthracene	10	330
60.	bis(2-Ethylhexyl)phthalate	10	330
61.	Chrysene	10	330
62.	Di-n-octyl Phthalate	10	330
63.	Benzo(b)fluoranthene	10	330
64.	Benzo(k)fluoranthene	10	330
65.	Benzo(a)pyrene	10	330
66.	Indeno(1,2,3-cd)pyrene	10	330
67.	Dibenz(a,h)anthracene	10	330
68.	Benzo(g,h,i)perylene	10	330

TABLE D-1 (CONT.)

Compound	Detection Limits Low Water [e] (ug/l)	Low Soil/Sediment [f] (ug/kg)
PESTICIDES		
1. alpha-BHC	.05	2
2. beta-BHC	.05	2
3. delta-BHC	.05	2
4. gamma-BHC (Lindane)	.05	2
5. Heptachlor	.05	2
6. Aldrin	.05	2
7. Heptachlor Epoxide	.05	2
8. Endosulfan I	.05	2
9. Dieldrin	.1	4
10. 4,4'-DDE	.1	4
11. Endrin	.1	4
12. Endosulfan II	.1	4
13. 4,4'-DDD	.1	4
14. Endrin Aldehyde	.1	4
15. Endosulfan Sulfate	.1	4
16. 4,4'-DDT	.1	4
17. Endrin Ketone	.1	4
18. Methoxychlor	.5	20
19. Chlordane	.5	20
20. Toxaphene	1.0	40
21. AROCHLOR 1016	.5	20
22. AROCHLOR 1221	.5	20
23. AROCHLOR 1232	.5	20
24. AROCHLOR 1242	.5	20
25. AROCHLOR 1248	.5	20
26. AROCHLOR 1254	1.0	40
27. AROCHLOR 1260	1.0	40

* Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable.

a Medium Water Contract Required Detection Limits (CRDL) for Volatile HSL Compounds are 100 times the individual Low Water CRDL.

b Medium Soil/Sediment Contract Required Detection Limits (CRDL) for Volatile HSL Compounds are 100 times the individual Low Soil/Sediment CRDL.

TABLE D-1 (CONT.)

c Medium Water Contract Required Detection Limits (CRDL) for Semi-Volatile HSL Compounds are 100 times the individual Low Water (CRDL).

d Medium Soil/Sediment Contract Required Detection Limits (CRDL) for Semi-Volatile HSL Compounds are 60 times the individual Low Soil/Sediment (CRDL).

e Medium Water Contract Required Detection Limits (CRDL) for Pesticide HSL Compounds are 100 times the individual Low Water (CRDL).

f Medium Soil/Sediment Contract Required Detection Limits (CRDL) for Pestidice HSL Compounds are 60 times the individual Low Soil/Sediment (CRDL).

TABLE D-2
INORGANIC ANALYSES

Element	Contract Required Detection Limits Water (ug/l)
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	5
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Tin	40
Vanadium	50
Zinc	20
Cyanide	10

TABLE D-3
PHENOXY HERBICIDE ANALYSES

Compound	Detection Limits Water (ug/l)	Soil/Sediment (ug/kg)
HERBICIDES		
1. 2,4-Dichlorophenoxyacetic acid (2,4-D)	0.05	0.2
2. 2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	0.05	0.2
3. Silvex/2,4,5-Trichlorophenoxy-propionic acid (2,4,5-TP)	0.05	0.2
4. 2-Methyl-4 chlorophenoxyacetic acid (MCPA)	0.05	0.2

TABLE D-4
ADDITIONAL ANALYSES

If the soil analyses indicate the presence of 2,4-D; 2,4,5-T; Silvex; or MCPA, archived soil samples will be submitted for dioxin analysis.

Laboratory analysis and contaminant quantification in soil samples will be conducted for:

- 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)
- 2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)
- Σ all 22 tetrachlorodibenzo-p-dioxin isomers (TCDDs)
- Σ all 38 tetrachlorodibenzofuran isomers (TCDFs)
- Σ all 14 pentachlorodibenzo-p-dioxin isomers (PsCDDs)
- Σ all 28 pentachlorodibenzofuran isomers (PeCDFs)
- Σ all 10 hexachlorodibenzo-p-dioxin isomers (HxCDDs)
- Σ all 16 hexachlorodibenzofuran isomers (HxCDFs)

APPENDIX E

QUALITY ASSURANCE MEMORANDA

ecology and environment, inc.
108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537
International Specialists in the Environmental Sciences

MEMORANDUM

DATE: February 6, 1986

TO: John Osborn, FIT RPO, USEPA, Seattle

FROM: Roger McGinnis, Chemist, E&E, Seattle
Andrew Hafferty, Senior Chemist, E&E, Seattle

THRU: D.A. Buecker, FIT RPM, E&E, Seattle

SUBJ: QA of Case 4679 (Inorganics)
Resource Recovery WA 0280

CC: Gerald Muth, DPO, USEPA, Region X
Harold Takenaka, DPO, USEPA, Region IX
Jack Sceva, USEPA, Seattle
Bill Ritthaler, E&E, Seattle

The Quality Assurance review of seven samples, Case 4679, collected at Resource Recovery has been completed. The seven water samples were analyzed at low level for inorganics by California Analytical Laboratories of West Sacramento, California. The samples were numbered:

MJA201	MJA206
MJA202	MJA207
MJA203	MJA208
MJA205	

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84J-091.

1) Timeliness - Acceptable

2) Initial Calibration - Acceptable

3) Continuing Calibration - Acceptable

4) Blanks - Acceptable

5) Instrument Detection Limits - Acceptable

6) ICP Interference Check - Acceptable

7) Laboratory Control Sample - Acceptable

8) Duplicate Sample Analysis - Acceptable

9) Spiked Sample Analysis

Two out of 24 spike % recoveries were out of control.

Element	% Recovery	QC Limit
Selenium	42%	75-125%
Thallium	58%	75-125%

10) Furnace AA - Acceptable

11) ICP Serial Dilutions

One out of 24 elements was out of control.

Element	% Difference	QC Limit
Potassium	13.9%	< 10%

12) Mercury Analysis - Acceptable

13) Samples

Selenium and thallium results are flagged as estimated (J) based on low spike recoveries. Interferences were noted in selenium analyses of samples MJA202, 203, 205, 206, and 207. Potassium results are flagged as estimated (J) due to differences between the serial dilution and sample analyses. Reported antimony detection limits were slightly higher than contract required limits.

Data Use

The usefulness of the data is basedon the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" (R-582-5-5-01).

Upon consideration of the data qualifications noted above, the data are ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of individual values.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality Control indicates that data unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

S - Indicates a value determined by method of standard addition.

RM:dlk

ecology and environment, inc.

108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537

International Specialists in the Environmental Sciences

MEMORANDUM

DATE: September 6, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: Roger McGinnis, Chemist, E&E, Seattle
Andrew Hafferty, Senior Chemist, E&E, Seattle

SUBJ: QA of Case 4679
Resource Recovery WA 0280

THRU: Dave Buecker, FIT RPM, E&E, Seattle

REF: TDD-R10-8507-01

CC: Gerald Muth, EPA, Manchester
Jack Sceva, EPA, Seattle
Harold Takenaka, DPO, EPA, Region IX
Bill Ritthaler, E&E, Seattle

The Quality Assurance review of two samples, Case 4679, collected at Resource Recovery has been completed. Two water samples were analyzed at low level for inorganics by California Analytical Laboratories of West Sacramento, California. The samples were numbered:

MJA234
MJA238

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA 84J091.

1) Timeliness - Acceptable

2) Calibration Verification - Acceptable

3) Blanks - Acceptable

Beryllium, chromium, iron, and vanadium were present in the laboratory blank but at levels less than the CRDL.

4) Instrument Detection Limits - Acceptable

5) ICP Interference Check - Acceptable

6) Laboratory Control Sample - Acceptable

7) Duplicate Sample Analysis - Acceptable

8) Spike Recoveries

One out of 24 elements was out of control.

Element	% Recovery	QC Limit
Mercury	70%	75-125%

9) Furnace AA - Acceptable

10) Mercury Analysis - Acceptable

11) Samples

Mercury results were flagged as estimated (J) based on low spike recovery.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (R-582-5-5-01)."

The data are ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of the individual values.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality control indicates that data are unusable (compound may or may not be present). Resampling and analysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

ecology and environment, inc.
108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537
International Specialists in the Environmental Sciences

MEMORANDUM

DATE: September 13, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: Roger McGinnis, Chemist, E&E, Seattle
Andrew Hafferty, Senior Chemist, E&E, Seattle

THRU: David Buecker, FIT RPM, E&E, Seattle

SUBJ: QA of Case 4768 (Inorganics)
Resource Recovery WA 0280

REF: TDD R10-8507-01

CC: Gerald Muth, EPA, Manchester
Harold Takenaka, DPO, EPA, Region IX
Bill Ritthaler, E&E, Seattle

The Quality Assurance review of 26 samples, Case 4768, collected at Resource Recovery has been completed. The eight water samples and 18 soil samples were analyzed at low level for inorganics by California Analytical Laboratories, Inc. of West Sacramento, California. The samples were numbered:

MJA222	MJA216	MJA231
MJA223	MJA217	MJA232
MJA221	MJA218	MJA233
MJA227	MJA219	MJA212
MJA237	MJA224	MJA213
MJA210	MJA225	MJA236
MJA211	MJA228	MJA248
MJA214	MJA229	MJA249
MJA215	MJA230	

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84A-266.

1) Timeliness - Acceptable

2) Initial Calibration - Acceptable

3) Continuing Calibration - Acceptable

4) Blanks - Acceptable

5) Instrument Detection Limits - Acceptable

6) ICP Interference Check - Acceptable

7) Laboratory Control Sample - Acceptable

8) Duplicate Sample Analysis

Two out of 24 of the water matrix sample % RPDs were out of control.

Element	% RPD	QC Limit
Lead	34%	<20%
Vanadium	21%	<20%

9) Spiked Sample Analysis

Two out of 18 soil matrix sample % recoveries were out of control.

Element	% Recovery	QC Limit
Antimony	58%	75-125%
Selenium	30%	75-125%

Four out of 24 water matrix sample % recoveries were out of control.

Element	% Recovery	QC Limit
Antimony	56%	75-125%
Arsenic	65%	75-125%
Lead	15%	75-125%
Thallium	68%	75-125%

10) ICP Serial Dilution

No serial dilution was done for a soil matrix sample.

11) Furnace AA - Acceptable

12) Mercury Analysis - Acceptable

13) Samples

Results are reported on a dry weight basis for soil matrix samples. Antimony and selenium results for soil samples are flagged as estimated (J) based on low spike recoveries.

Vanadium results for water matrix samples are flagged as estimated (J) due to low duplicate analysis RPDs. Antimony, arsenic, and thallium results for water samples are flagged as estimated (J) based on low spike recoveries. Lead results for water samples are rejected (R) due to excessively low spike recovery.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" (R-582-5-5-01).

The data are ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of the individual values.

Lead data for water samples are NOT usable.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

E - The detection limit was elevated as a result of matrix interference.

RM:dk

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108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537
International Specialists in the Environmental Sciences

MEMORANDUM

DATE: September 13, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: Roger McGinnis, Chemist, E&E, Seattle
Andrew Hafferty, Senior Chemist, E&E, Seattle

THRU: Dave Buecker, FIT RPM, E&E, Seattle

SUBJ: QA of Case 4768 (HSL Organics)
Resource Recovery, WA 0280

REF: TDD R10-8507-01

CC: Gerald Muth, EPA, Manchester
Jack Sceva, EPA, Seattle
Harold Takenaka, DPO, EPA, Region IX
Bill Ritthaler, E&E, Seattle

The Quality Assurance review of 12 samples, Case 4768, collected at Resource Recovery Landfill has been completed. The 12 water samples were analyzed at low level by Analytical Technologies, Inc. of National City, California for full HSL organics. The samples were numbered:

JA301	JA554	JA573
JA302	JA568	JA574
JA303	JA571	JA575
JA338	JA572	JA576

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84A-266.

I. Volatiles and Semi-Volatile Compounds

1) Timeliness - Acceptable

2) GC/MS Instrument Tuning - Acceptable

3) Initial Calibration - Acceptable

4) Continuing Calibration - Acceptable

5) Instrument Detection Limits - Acceptable

6) Blanks

The VOA fraction blanks all contained several contaminants but all were present at levels less than the CRDL.

The semi-volatile fraction blanks contained several contaminants present at levels less than the CRDL. The BNA blank prepared on 8/08/85 contained 84 ug/l of di-n-octylphthalate which is greater than 5 times the CRDL.

7) Surrogate Recoveries

Twelve out of 96 semi-volatiles % Recoveries were out of control.

Sample	Compound	% Recovery	QC Limit
JA568	d_5-nitrobenzene	33%	41-120%
JA571	d_5-nitrobenzene	12%	41-120%
JA573	d_5-phenol	10%	15-96 %
	2-fluoropheol	4%	23-107%
	2,4,6-tribromophenol	7%	20-105%
JA575	d_5-nitrobenzene	27%	41-120%
JA576	d_5-nitrobenzene	3%	41-120%
	2-flurobiphenyl	27%	44-119%
JA301	d_5-nitrobenzene	0%	41-120%
	2-flurobiphenyl	1%	44-119%
JA303RE	2-flurobiphenyl	33%	44-119%
Blank (8/13/85)	2-flurobiphenyl	39%	44-119%

Samples JA568, JA571, JA573, JA575, JA576, and JA301 were not re-extracted as required, due to insufficient sample volume.

8) Matrix Spike and Matrix Spike Duplicates

Two out of 20 VOA % Recoveries were out of control.

Sample	Compound	% Recovery	QC Limit
JA554 MS	1,1-dichloroethene	150%	61-145%
JA554 MSD	1,1-dichloroethene	150%	61-145%

Six out of 48 semi-volatile % Recoveries were out of control.

Sample	Compound	% Recovery	QC Limit
JA572 MSD	1,2,4-Trichlorobenzene	35%	39-98 %
JA572 MS	di-n-butylphthalate	10%	11-117%

Sample	Compound	% Recovery	QC Limit
JA572 MS	2-chlorophenol	138%	27-123%
JA572 MSD	2-chlorophenol	148%	27-123%
JA572 MS	2-chloro-3-methylphenol	141%	23-97 %
JA572 MSD	2-chloro-3-methylphenol	141%	23-97 %

9) Laboratory Contact

The laboratory was contacted on September 19, 1985. See attached telephone log.

10) Samples

The results for the base/neutral fraction of samples JA301 and JA576 were rejected (R) for compounds not detected and were flagged as estimated (J) for compounds which were detected, as required when surrogate % Recoveries are less than 10%.

The results for the acid fraction of sample JA573 were rejected (R) for compounds not detected and were flagged as estimated (J) for compounds which were detected, as required when surrogate % Recoveries were less than 10%.

II. Pesticides/PCBs

1) Timeliness - Acceptable

2) Instrument Performance - Acceptable

3) Calibration

The laboratory reported the linearity standard deviation rather than the % RSD on 8/07/85. The % RSD for Endrin was 13% (QA Limit < 10%).

4) Blanks - Acceptable

5) Surrogate Recoveries

Four dibutylchlorendate surrogate % Recoveries were outside the advisory limits.

6) Matrix Spike and Matrix Spike Duplicates - Acceptable

7) Samples

Results for Endrin were flagged as estimated (J) based on a high % RSD.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" (R-582-5-5-01).

The data are ACCEPTABLE for use except where flagged with data qualifiers which modify the use of the individual values.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

RM:jkb

In Reference to Case No(s):
4768

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: 6 September 85

Laboratory Name: Analytical Technologies Inc

Lab Contact: Mike Hiatt

Region: 10

Regional Contact: Andrew Haffenty

Call Initiated By: ____ Laboratory ___X___ Region

In reference to data for the following sample number(s):

Summary of Questions/Issues Discussed:
1. VOA LLDs for CS_2, 1,1 dichloroethene, 1122 tetrachloroethane
2. Benzidine LLD varies
3. JA554RE why no PCP hit reported
4. JA575 why no trans 1,2 -dichloroethene hit reported

Summary of Resolution:
1530 call by AH to ATI - M.K. Hiatt unavailable will call back
19 Sept contact with M.K. Hiatt - missed connections several times previously
1 & 2 normal LLD not close enough to required LLD - lab made aware of the discrepancy
#3 PCP hit is real we will edit data and initial
#4 - not a real hit

Signature

19 September 85
Date

Distribution: (1)Lab Copy, (2)Region Copy, (3)SMO Copy

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International Specialists in the Environmental Sciences

MEMORANDUM

DATE: September 6, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: John Ryding, Chemist, E&E, Seattle JMR
Andrew Hafferty, Senior Chemist, E&E, Seattle 9/9/85

SUBJ: QA of Case 4679 (Organics)
Resource Recovery WA 0280

THRU: Dave Buecker, FIT RPM, E&E, Seattle

REF: TDD-R10-8507-01

CC: Gerald Muth, EPA, Manchester
John Tilstra, DPO, EPA, Region VIII
Andrew Hafferty, E&E, Seattle

The Quality Assurance review of fourteen samples, Case 4679, collected at Resource Recovery has been completed. Fourteen water samples were analyzed at low level by Rocky Mountain Analytical Lab of Arvada, Colorado. Four samples were analyzed for volatiles, nine samples were analyzed for full HSL organics and one sample was analyzed for extractables. The samples were numbered:

Sample	Analysis	Sample	Analysis
JA533	HSL	JA540	HSL
JA534	VOA	JA541	HSL
JA535	HSL	JA542	VOA
JA536	HSL	JA569	HSL
JA537	VOA	JA570	HSL
JA538	HSL	JA578	VOA
JA539	HSL	JA579	Extractables

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84A-266.

1) Timeliness

The pesticide fraction extraction of samples JA533, JA535, JA536, JA538, JA539, JA540 and JA541 took place eight days after sample receipt. The QC limit is five days.

2) Instrument Tuning - Acceptable

3) Initial Calibration - Acceptable

4) Continuing Calibration

Two SPCC compounds were out of control.

Compound	Date	Fraction	RF	QC Limit
1,1,2,2-Tetrachloroethane	7/13	VOA	0.286	>0.300
2,4-Dinitrophenol	7/31	BNA	0.030	>0.050

One CCC compound was out of control.

Compound	Date	Fraction	%D	QC Limit
4-Chloro-3-methylphenol	8/17	BNA	43	25%

5) Detection Limits - Acceptable

6) Pesticide Standards

a. Linearity - The following compounds exceeded QC Limits.

Compound	Date	Column	% RSD	QC Limit
4,4'-DDT	7/25/85	3% OV-1	13	<10%
Aldrin	7/29/85	1.5% OV-17/1.95% QF-1	12.1	<10%

b. 4,4'DDT/Endrin Breakdown - Acceptable

c. Dibutylchlorendate Retention Time Shift

Sample	Date	Column	% D	QC Limit
JA533	7/25	3% OV-1	3.3	<2%
JA569	7/31	3% OV-1	3.7	<2%
JA570	7/31	3% OV-1	2.6	<2%
JA569	7/29	1.5% OV-17/1.95% QF-1	2.4	<2%

d. Standards Summary

The following compounds were out of control.

Compound	Date	Column	% D	QC Limit
4,4'-DDT	7/26	3% OV-1	24	<20%
Methoxychlor	8/1	3% OV-1	37	<20%

7) Blanks - Methylene Chloride, 2-Hexanone and 4-Methyl-2-Pentanone were reported in the blank.

8) Surrogates - Acceptable

9) Matrix Spike and Matrix Spike Duplicate

The following compounds exceeded % Recovery QC limits in samples JA533 (BNA) and JA535 (Pest.).

Compound		Fraction	% Recovery	QC Limits
1,2,4-Trichlorobenzene	(MS)	B/N	104%	39-98 %
1,2,4-Trichlorobenzene	(MSD)	B/N	118%	39-98 %
Pyrene	(MS)	B/N	128%	26-127%
Pentachlorophenol	(MS)	Acid	130%	09-103%
Pentachlorophenol	(MSD)	Acid	140%	09-103%
Lindane	(MS)	Pest.	130%	56-123%
Lindane	(MSD)	Pest.	135%	56-123%
Heptachlor	(MS)	Pest.	140%	40-131%
Heptachlor	(MSD)	Pest.	135%	40-131%
Aldrin	(MS)	Pest.	130%	40-120%
Aldrin	(MSD)	Pest.	125%	40-120%
Dieldrin	(MS)	Pest.	140%	52-126%
Dieldrin	(MSD)	Pest.	142%	52-126%
Endrin	(MS)	Pest.	142%	56-121%
Endrin	(MSD)	Pest.	134%	56-121%
4,4'-DDT	(MS)	Pest.	150%	38-127%
4,4'-DDT	(MSD)	Pest.	144%	38-127%

One compound in the B/N fraction of JA579 MSD was out of control for RPD.

Compound	RPD	QC Limit
Di-n-Butylphthalate	69.7	<40

10) Samples - TICs found in certain samples were also detected at equivalent levels in the blank. These compounds were deleted from the data sheets.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses (R-582-5-5-01)."

The data is ACCEPTABLE for use except where data qualifiers modify the usefulness of individual values.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality Control indicates that data are unusable (compound may or may not be present).

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

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108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537
International Specialists in the Environmental Sciences

MEMORANDUM

DATE: October 16, 1985

TO: John Osborn, FIT RPO, EPA, Seattle

FROM: John Ryding, Chemist, E&E, Seattle
Andrew Hafferty, Senior Chemist, E&E, Seattle

THRU: D.A. Buecker, FIT RPM, E&E, Seattle

SUBJ: QA of Case 4768 (Organics)
Resource Recovery WA 0280

REF: TDD R10-8510-01

CC: Gerald Muth, DPO, EPA, Region X
Harold Takenaka, DPO, EPA, Region IX
Bill Ritthaler, E&E, Seattle

The Quality Assurance review of 17 samples with one duplicate, Case 4768, collected at Resource Recovery has been completed. One soil sample was analyzed at low level for HSL volatiles only by EAL Corporation of Richmond, California. Sixteen soil samples and one duplicate were analyzed at low levels for HSL semi-volatiles and pesticides only. The samples were numbered:

JA339 (VOA)	JA551	JA561
JA544	JA552	JA562
JA545	JA553	JA563
JA548	JA557	JA563 (dup)
JA549	JA558	JA565
JA550	JA560	JA566

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control specifications outlined in IFB WA84A-266.

1) Timeliness

The laboratory extracted and analyzed all samples withing QC time limits. However, the following samples were held in the field for more two days prior to shipment to the lab:

Sample No	Holding Time in the Field
JA548	13 days
JA549	13
JA550	11
JA551	11
JA552	6
JA553	6
JA557	6
JA558	6
JA563	19
JA565	17
JA566	17

2) Instrument Tuning - Acceptable

3) Initial and Continuing Calibrations - Acceptable

4) Detection Limits

In some instances, the detection limits for the multi-component pesticides and PCBs were above the CRDL.

5) Pesticide Standards

a) Linearity

On column SP-2250/SP-2401 (quantitation). This is a questionable choice as a confirmation column.

Date	Instrument	Compound	% RSD	QC Limit
9/9/85	2	Aldrin	14%	10%
9/9/85	2	4,4'-DDT	16%	10%
9/12/85	1	4,4'-DDT	16%	10%
9/12/85	2	Aldrin	14%	10%
9/12/85	2	4,4'-DDT	21%	10%

On column SE-30/SP-2401 (confirmation)

Date	Instrument	Compound	% RSD	QC Limit
9/9/85	2	4,4'-DDT	11%	10%
9/12/85	2	4,4'-DDT	16%	10%

b) 4,4'-DDT/Endrin Breakdown - Acceptable

c) Dibutylchlorendate Retention Time Shift - Acceptable

d) Standards Summary

On the quantitation column

Instrument	Compound	% D	QC Limit
1	Endosulfan Sulfate	35%	15%

6) Blanks

Methylene chloride and bis(2-ethylhexyl)phthalate were found in the VOA and BNA blanks. The pesticide blank is not acceptable, the laboratory should take immediate action to eliminate an ongoing pesticide blank problem noted by the reviewers. Only one blank was run with two sets of samples run on different days.

7) Surrogates

Acceptable as reported; however, most of the surrogate recoveries could not be reproduced from the raw data.

8) Matrix Spike and Matrix Spike Duplicate

The following compounds exceeded QC limits for % recovery:

Compound	% Recovery	QC Limit
1,2,4-Trichlorobenzene (MSD)	34	38-107%
Pyrene (MS)	32	35-142%
Pyrene (MSD)	24	35-142%
Lindane (MS)	328	46-127%
Lindane (MSD)	364	46-127%
Heptachlor (MS)	24	35-130%
Heptachlor (MSD)	197	35-130%
Aldrin (MS)	373	34-132%
Aldrin (MSD)	392	34-132%
Endrin (MSD)	153	42-139%
4,4'-DDT (MS)	149	23-134%
4,4'-DDT (MSD)	163	23-134%

The % recoveries could not be reproduced from the raw data.

The following compounds exceed QC limits for RPD:

Compound	RPD	QC Limit
Acenaphthene	41	<19
1,4-Dichlorobenzene	28	<27
Phenol	68	<35
4-Nitrophenol	55	<50
Heptachlor	157	<31

9) Samples

The volatile fraction data of JA339 was flagged "J" due to the surrogate recoveries and contaminant concentrations being non-reproducible. The BNA data for samples JA550-JA560 was flagged "J" due to the non-reproducibility of the contaminant concentrations and surrogate recoveries. With a few exceptions all positive hits in the pesticide fraction were flagged "R" due to severe contamination in the blank. These exceptions are: JA557 4,4-DDD flagged "N," JA560 endosulfan sulfate and methoxychlor flagged "N," PCB data in JA560 acceptable (with "J"), and JA561 Aroclor 1242 flagged "N." All pesticide data has been flagged "J" due to poor linearity.

10) Tentatively Identified Compounds

4-Hydroxy-4-methyl-2-pentanone (diacetone alcohol) was detected and in some cases identified on the TIC data sheets in nearly every sample. This compound was detected in the blank but at significantly lower levels than in the samples. However, this compound is an aldol concensation product of an acetone reaction which has been noted is several other EAL data packages, e.g., E&E , QA memo dated October 3, 1985; Case 4680 from R. McGinnis and A. Hafferty to J. Osborn, RPO, USEPA, Region X. The data is not reliable and has been deleted from the data sheets in this report.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Dta Validation Functional Guidelines for Evaluating Organic Analyses (R-582-5-5-01)."

Considering the above mentioned factors, the data is useful for LIMITED PURPOSES ONLY.

Pesticide/PCB data indicating positive results, except where specifically mentioned, is unusable.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

JR:dlk

ecology and environment, inc.
108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537
International Specialists in the Environmental Sciences

MEMORANDUM

DATE: October 16, 1985

TO: John Osborn, FIT RPO, EPA, Seattle

FROM: John Ryding, Chemist, E&E, Seattle
Andrew Hafferty, Senior Chemist, E&E, Seattle

THRU: D.A. Buecker, FIT RPM, E&E, Seattle

SUBJ: QA of Case 4768 (Organics)
Resource Recovery WA 0280

REF: TDD R10-8510-01

CC: Gerald Muth, DPO, EPA, Region X
Harold Takenaka, DPO, EPA, Region IX
Bill Ritthaler, E&E, Seattle

The Quality Assurance review of two samples, Case 4768, collected at Resource Recovery has been completed. Two soil samples were analyzed at low level for semi-volatiles and pesticides/PCBs by EAL Corporation of Richmond, California. The samples were numbered:

JA546 JA547

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control specifications outlined in IFB WA84A-266.

1) Timeliness - Acceptable

2) Instrument Tuning - Acceptable

3) Initial and Continuing Calibration - Acceptable

4) Detection Limits

Limits for multi-component pesticides and PCBs were above the CRDL.

5) Pesticide Standards

a) Linearity

On column SP-2250/SP-2401 (quantitation)

Compound	% RSD	QC Limit
Aldrin	15%	10%
Endrin	12%	10%
4,4'-DDT	21%	10%

On column SE-30/SP-2401 (confirmation). This is a questionable choice as a confirmation column.

Compound	% RSD	QC Limit
4,4'-DDT	16%	10%

b) 4,4'-DDT/Endrin Breakdown - Acceptable

c) Dibutylchlorendate Retention Time Shift - Acceptable

d) Standards Summary - Acceptable

6) Blanks

Bis(2-ethylhexyl)phthalate was found in the BNA blank. The pesticide blank is not acceptable. The laboratory should take immediate action to eliminate an ongoing pesticide blank problem noted by the reviewers.

7) Surrogates

Acceptable as reported; however, most of the surrogate recoveries could not be reproduced from the raw data.

8) Matrix Spike and Matrix Spike Duplicate

The following compounds exceeded QC limits for % recovery:

Compound	% Recovery	QC Limit
1,2,4-Trichlorobenzene (MSD)	34	38-107%
Pyrene (MS)	32	35-142%
Pyrene (MSD)	24	35-142%
Lindane (MS)	328	46-127%
Lindane (MSD)	364	46-127%
Heptachlor (MS)	24	35-130%

Heptachlor (MSD)	197	35-130%
Aldrin (MS)	373	34-132%
Aldrin (MSD)	392	34-132%
Endrin (MSD)	153	42-139%
4,4'-DDT (MS)	149	23-134%
4,4'-DDT (MSD)	163	23-134%

The % recoveries could not be reproduced from the raw data.

The following compounds exceed QC limits for RPD:

Compound	RPD	QC Limit
Acenaphthene	41	<19
1,4-Dichlorobenzene	28	<27
Phenol	68	<35
4-Nitrophenol	55	<50
Heptachlor	157	<31

9) Samples

The BNA fraction data was flagged "J" due to the non-reproducibility of the contaminant concentrations and surrogate recoveries. All positive hits of the pesticide fraction were flagged "R" due to severe contamination of the blank. All pesticide data was flagged "J" due to poor linearity.

10) Tentatively Identified Compounds

4-Hydroxy-4-methyl-2-pentanone (diacetone alcohol) was detected and identified on the TIC data sheets in nearly every sample. This compound was detected in the blank but at significantly lower levels than in the samples. However, this compound is an aldol condensation product of an acetone reaction which has been noted in several other EAL data packages, e.g., E&E, QA memo data October 3, 1985; Case 4680 from R. McGinnis and A. Hafferty to J. Osborn, RPO, USEPA, Region X. The data is not reliable and has been deleted from the data sheets in this report.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses (R-582-5-5-01)."

Considering the above mentioned factors, the data is useful for LIMITED PURPOSES ONLY.

Pesticide/PCB data is suspect.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

JR:dlk

APPENDIX F

SUBSURFACE SOIL ANALYTICAL RESULTS

Explanation of data modifiers:

U:	undetected at specified level
J:	estimated concentration only
R:	value rejected during Quality Assurance review
*:	not analyzed for
GW:	depth at which ground water was encountered
SCAN:	Relative Retention Time Indicator

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF BASE/NEUTRAL/ACID COMPOUND RESULTS
FOR SUBSURFACE SEDIMENT SAMPLES COLLECTED JULY/AUGUST 1985
(ug/kg) DRY WEIGHT

LOCATION	N-NITROSO DIMETHYLAMINE	PHENOL	ANILINE	BIS(2-CHLORO ETHYL)ETHER	2-CHLORO-PHENOL	1,3-DICHLORO BENZENE	1,4-DICHLORO BENZENE	BENZYL ALCOHOL
EE1 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE1 30'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE2 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE2 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE3 10-30'	350.00 U	260.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE3 30'-GW	350.00 U	1900.00 J	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE4 10-20'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE4 20'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE5 10-20'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE5 20'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE6 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE6 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE7 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE7 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE8 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE8 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE9 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE9 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U

LOCATION	1,2-DICHLORO BENZENE	2-METHYLPHENOL	BIS(2CHLOROISO PROPYL)ETHER	4-METHYL PHENOL	N-NITROSO DIPROPYLAMINE	HEXACHLORO ETHANE	NITROBENZENE	ISOPHORONE
EE1 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE1 30'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE2 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE2 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE3 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE3 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE4 10-20'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE4 20'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE5 10-20'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE5 20'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE6 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE6 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE7 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE7 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE8 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE8 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE9 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE9 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U

LOCATION	2-NITROPHENOL	2,4-DIMETHYL PHENOL	BENZOIC ACID	BIS(2-CHLORO ETHOXY)METHANE	2,4 DICHLORO PHENOL	1,2,4 - TRI CHLOROBENZENE	NAPHTHALENE
EE1 10-30'	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE1 30'-GW	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE2 10-30'	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE2 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE3 10-30'	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 J
EE3 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE4 10-20'	340.00 U	340.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE4 20'-GW	340.00 U	340.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE5 10-20'	360.00 U	360.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE5 20'-GW	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE6 10-30'	360.00 U	360.00 U	1700.00 U	1700.00 U	1700.00 U	1700.00 U	1700.00 U
EE6 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE7 10-30'	340.00 U	340.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE7 30'-GW	350.00 U	350.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE8 10-30'	350.00 U	350.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE8 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE9 10-30'	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE9 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U

LOCATION	4-CHLORO ANILINE	HEXACHLORO BUTADIENE	4-CHLORO-3-METHYLPHENOL	2-METHYL NAPHTHALENE	HEXACHLOROCY CLOPENTADIENE	2,4,6-TRI CHLOROPHENOL	2,4,5-TRI CHLOROPHENOL
EE1 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	1700.00 U
EE1 30'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	1700.00 U
EE2 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U
EE2 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U
EE3 10-30'	350.00 U	350.00 U	350.00 U	1200.00 J	350.00 U	350.00 U	1700.00 U
EE3 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U
EE4 10-20'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U
EE4 20'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U
EE5 10-20'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	1700.00 U
EE5 20'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	1700.00 U
EE6 10-30'	1700.00 U	1700.00 U	1700.00 U	1700.00 U	1700.00 U	1700.00 U	1700.00 U
EE6 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U
EE7 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	1700.00 U
EE7 30'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	1700.00 U
EE8 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	1700.00 U
EE8 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U
EE9 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	1700.00 U
EE9 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	1700.00 U

LOCATION	2-CHLORO NAPHTHALENE	2-NITROANILINE	DIMETHYL PHTHALATE	ACENAPHTHYLENE	3-NITROANILINE	ACENAPHTHENE
EE1 10-30'	340.00 U	1700.00 U	340.00 U	340.00 U	1700.00 U	340.00 U
EE1 30'-GW	340.00 U	1700.00 U	340.00 U	340.00 U	1700.00 U	340.00 U
EE2 10-30'	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	350.00 U
EE2 30'-GW	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	350.00 UJ
EE3 10-30'	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	370.00 J
EE3 30'-GW	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	350.00 U
EE4 10-20'	340.00 U	1700.00 U	340.00 U	340.00 U	700.00 U	340.00 U
EE4 20'-GW	340.00 U	1700.00 U	340.00 U	340.00 U	1700.00 U	340.00 U
EE5 10-20'	340.00 U	1700.00 U	340.00 U	340.00 U	700.00 U	360.00 U
EE5 20'-GW	340.00 U	1700.00 U	340.00 U	340.00 U	1700.00 U	340.00 U
EE6 10-30'	360.00 U	1700.00 U	360.00 U	360.00 U	1700.00 U	360.00 U
EE6 30'-GW	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	350.00 U
EE7 10-30'	340.00 U	1700.00 U	340.00 U	340.00 U	1700.00 U	340.00 U
EE7 30'-GW	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	340.00 U
EE8 10-30'	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	350.00 U
EE8 30'-GW	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	350.00 U
EE9 10-30'	360.00 U	1700.00 U	360.00 U	360.00 U	1700.00 U	360.00 U
EE9 30'-GW	350.00 U	1700.00 U	350.00 U	350.00 U	1700.00 U	360.00 U

LOCATION	2,4-DINITRO PHENOL	4-NITROPHENOL	DIBENZOFURAN	2,4-DINITRO TOLUENE	2,6-DINITRO TOLUENE	DIETHYL PHTHALATE	4-CHLORO-PHENYL/PHENYL ETHER	FLUORENE
EE1 10-30'	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE1 30'-GW	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE2 10-30'	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE2 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE3 10-30'	1700.00 U	1700.00 U	190.00 J	350.00 U	350.00 U	350.00 U	350.00 U	270.00 J
EE3 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE4 10-20'	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE4 20'-GW	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE5 10-20'	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE5 20'-GW	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE6 10-30'	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE6 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE7 10-30'	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE7 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE8 10-30'	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE8 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE9 10-30'	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE9 30'-GW	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U

LOCATION	4-NITROANILINE	4,6-DINITRO-2 METHYLPHENOL	N-NITROSODI PHENYLAMINE	4-BROMOPHENYL PHENYL ETHER	HEXACHLORO BENZENE	PENTACHLORO PHENOL	PHENANTHRENE	ANTHRACENE
EE1 10-30'	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U
EE1 30'-GW	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U
EE2 10-30'	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U
EE2 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U
EE3 10-30'	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	1300.00 J	200.00 J
EE3 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U
EE4 10-20'	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U
EE4 20'-GW	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U
EE5 10-20'	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U
EE5 20'-GW	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U
EE6 10-30'	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U
EE6 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U
EE7 10-30'	1700.00 U	1700.00 U	340.00 U	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U
EE7 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U
EE8 10-30'	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U
EE8 30'-GW	1700.00 U	1700.00 U	350.00 U	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U
EE9 10-30'	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U
EE9 30'-GW	1700.00 U	1700.00 U	360.00 U	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U

LOCATION	DI-N-BUTYL PHTHALATE	FLUORANTHENE	BENZIDINE	PYRENE	BUTYL BENZYL PHTHALATE	3,3'-DICHLORO BENZIDINE	BENZO(A) ANTHRACENE	BIS(2-ETHYL HEXYL)PHTHALATE
EE1 10-30'	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	680.00 U	340.00 U	340.00 U
EE1 30'-GW	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	680.00 U	340.00 U	340.00 U
EE2 10-30'	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	386.00 U
EE2 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	350.00 U
EE3 10-30'	2000.00 J	960.00 J	1700.00 U	1400.00 J	430.00 J	700.00 U	320.00 J	1400.00 U
EE3 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	390.00 U
EE4 10-20'	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	680.00 U	340.00 U	340.00 U
EE4 20'-GW	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	690.00 U	340.00 U	340.00 U
EE5 10-20'	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U	710.00 U	360.00 U	360.00 U
EE5 20'-GW	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	680.00 U	340.00 U	340.00 U
EE6 10-30'	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U	720.00 U	360.00 U	360.00 U
EE6 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	350.00 U
EE7 10-30'	340.00 U	340.00 U	1700.00 U	340.00 U	340.00 U	170.00 U	340.00 U	340.00 U
EE7 30'- GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	350.00 U
EE8 10-30'	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	350.00 U
EE8 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	350.00 U
EE9 10-30'	360.00 U	360.00 U	1700.00 U	360.00 U	360.00 U	720.00 U	360.00 U	360.00 U
EE9 30'-GW	350.00 U	350.00 U	1700.00 U	350.00 U	350.00 U	700.00 U	350.00 U	350.00 U

LOCATION	CHRYSENE	DI-N-OCTYL PHTHALATE	BENZO(B) FLUORANTHENE	BENZO(K) FLUORANTHENE	BENZO(A) PYRENE	INDENO(1,2,3-CD) PYRENE	DIBENZ(A,H) ANTHRACENE
EE1 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE1 30'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE2 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	450.00 R	350.00 U	350.00 U
EE2 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	365.00 R	350.00 U	350.00 U
EE3 10-30'	220.00 J	1900.00 J	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE3 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	150.00 J	350.00 U	350.00 U
EE4 10-20'	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE4 20'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE5 10-20'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE5 20'-GW	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U	340.00 U
EE6 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE6 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE7 10-30'	340.00 U	340.00 U	340.00 U	340.00 U	170.00 J	340.00 U	340.00 U
EE7 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	160.00 J	350.00 U	350.00 U
EE8 10-30'	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE8 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U
EE9 10-30'	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U	360.00 U
EE9 30'-GW	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U	350.00 U

LOCATION	BENZO(G,H,I) PERYLENE
EE1 10-30'	340.00 U
EE1 30'-GW	340.00 U
EE2 10-30'	350.00 U
EE2 30'-GW	350.00 U
EE3 10-30'	350.00 U
EE3 30'-GW	350.00 U
EE4 10-20'	340.00 U
EE4 20'-GW	340.00 U
EE5 10-20'	360.00 U
EE5 20'-GW	340.00 U
EE6 10-30'	360.00 U
EE6 30'-GW	350.00 U
EE7 10-30'	340.00 U
EE7 30'-GW	350.00 U
EE8 10-30'	350.00 U
EE8 30'-GW	350.00 U
EE9 10-30'	360.00 U
EE9 30'-GW	350.00 U

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF PESTICIDE AND PCB RESULTS
FOR SUBSURFACE SEDIMENT SAMPLES COLLECTED JULY/AUGUST 1985
ug/kg DRY WEIGHT

SAMPLE LOCATION	ALPHA-BHC	BETA-BHC	GAMMA-BHC (LINDANE)	HEPTACHLOR	ALDRIN	HEPTACHLOR EPOXIDE	ENDOSULFAN I	DIELDRIN	4,4'-DDE	DELTA-BHC
EE1 10-30'	2.00 U	6.50 R	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	4.00 U	4.00 U	2.00 U
EE1 30'-GW	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	4.00 U	4.00 U	2.00 U
EE2 10-30'	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	9.80 R	2.00 U	4.00 U	4.00 U	2.00 R
EE2 30'-GW	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	12.00 R	2.00 U	4.00 U	4.00 U	3.20 R
EE3 10-30'	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	8.00 U	8.00 U	4.00 U
EE3 30'-GW	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	5.00 R	11.00 R	4.00 U
EE4 10-20'	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	8.80 R	2.00 U	4.00 U	4.60 R	2.00 U
EE4 20'-GW	2.60 R	2.00 U	2.00 U	2.00 U	2.00 U	10.00 R	2.00 U	4.00 U	5.30 R	2.20 R
EE5 10-20'	2.50 R	2.00 U	2.00 U	2.00 U	2.00 U	12.00 R	2.00 U	4.00 U	5.50 R	2.20 R
EE5 20'-GW	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	5.10 R	2.00 U	4.00 U	4.00 U	2.00 U
EE6 10-30'	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	4.00 U	4.00 U	4.00 R
EE6 30'-GW	2.00 U	2.00 U	2.00 R	2.00 U	2.00 U	2.00 U	2.00 U	4.00 U	4.00 U	4.50 R
EE7 10-30'	2.00 U	100.00 R	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	4.00 U	4.00 U	5.50 R
EE7 30'-GW	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	4.00 U	4.00 U	2.00 U
EE8 10-30'	2.00 U	7.20 R	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	4.00 U	4.00 U	2.00 U
EE8 30'-GW	2.00 U	24.00 R	2.00 U	9.00 R	2.00 U	6.50 R	2.00 U	4.00 U	4.00 U	3.90 R
EE9 10-30'	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	4.10 R	2.00 U	4.00 U	2.00 U
EE9 30'-GW	2.00 U	2.00 U	2.00 U	6.30 R	2.00 U	6.00 R	2.00 U	4.00 U	4.50 R	3.80 R

LOCATION	ENDRIN	ENDOSULFAN II	4,4'-DDD	ENDRIN ALDEHYDE	ENDOSULFAN SULFATE	4,4'-DDT	ENDRIN KETONE	METHOXY-CHLOR	CHLORDANE	TOXAPHENE
EE1 10-30'	6.50 R	4.00 U	4.00 U	4.00 U	4.00 U	13.00 R	4.00 U	20.00 U	40.00 U	500.00 U
EE1 30'-GW	4.90 R	4.00 U	4.00 U	4.00 U	4.00 U	9.90 R	4.00 U	20.00 U	40.00 U	500.00 U
EE2 10-30'	4.00 U	4.00 U	4.00 U	4.00 U	20.00 R	4.00 U	4.00 U	20.00 U	50.00 U	600.00 U
EE2 30'-GW	4.00 U	4.00 U	12.00 R	4.00 U	33.00 R	4.00 U	4.00 U	20.00 U	60.00 U	700.00 U
EE3 10-30'	8.00 U	8.00 U	8.00 U	8.00 U	130.00 R	8.00 U	8.00 U	75.00 R	40.00 U	80.00 U
EE3 30'-GW	8.00 U	18.00 U	8.00 U	20.00 R	79.00 R	32.00 R	8.00 U	40.00 U	40.00 U	80.00 U
EE4 10-20'	6.20 R	4.00 U	4.00 U	4.00 U	9.20 R	11.00 R	4.00 U	20.00 U	60.00 U	500.00 U
EE4 20'-GW	7.50 R	4.00 U	4.00 U	4.00 U	30.00 R	13.00 R	4.00 U	20.00 U	60.00 U	500.00 U
EE5 10-20'	7.50 R	4.00 U	4.00 U	4.00 U	4.00 U	18.00 R	4.00 U	20.00 U	70.00 U	600.00 U
EE5 20'-GW	8.40 R	12.00 R	4.00 U	4.00 U	20.00 R.	11.00 R	4.00 U	20.00 U	60.00 U	500.00 U
EE6 10-30'	6.30 R	4.00 U	4.00 U	4.00 U	52.00 R	12.00 R	4.00 U	20.00 U	40.00 U	600.00 U
EE6 30'-GW	5.70 R	4.00 U	4.00 U	4.00 U	4.00 U	11.00 R	4.00 U	20.00 U	40.00 U	500.00 U
EE7 10-30'	4.00 U	4.00 U	5.10 R	4.00 U	36.00 R	8.40 R	4.00 U	20.00 U	40.00 U	400.00 U
EE7 30'-GW	5.00 R	4.00 U	4.00 U	4.00 U	47.00 R	12.00 R	4.00 U	20.00 U	40.00 U	500.00 U
EE8 10-30'	5.00 R	4.00 U	4.00 U	4.00 U	4.00 U	9.80 R	4.00 U	20.00 U	40.00 U	500.00 U
EE8 30'-GW	4.00 U	4.00 U	4.00 U	4.00 U	43.00 R	11.00 R	4.00 U	20.00 U	40.00 U	600.00 U
EE9 10-30'	5.40 U	4.00 U	4.00 U	4.00 U	69.00 R	15.00 R	4.00 U	20.00 U	40.00 U	800.00 U
EE9 30'-GW	6.80 R	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	20.00 U	40.00 U	500.00 U

LOCATION	AROCLOR-1016	AROCLOR-1221	AROCLOR-1232	AROCLOR-1242	AROCLOR-1248	AROCLOR-1254	AROCLOR-1260
EE1 10-30'	40.00 U	70.00 U	70.00 U	60.00 U	60.00 U	100.00 U	80.00 U
EE1 30'-GW	40.00 U	70.00 U	70.00 U	60.00 U	60.00 U	100.00 U	80.00 U
EE2 10-30'	40.00 U	60.00 U	70.00 U	40.00 U	50.00 U	100.00 U	100.00 U
EE2 30'-GW	50.00 U	80.00 U	90.00 U	50.00 U	60.00 U	200.00 U	100.00 U
EE3 10-30'	40.00 U	40.00 U	40.00 U	3100.00 J	40.00 U	1400.00 J	80.00 U
EE3 30'-GW	40.00 U	40.00 U	40.00 U	140.00 R	40.00 U	80.00 U	80.00 U
EE4 10-20'	40.00 U	70.00 U	80.00 U	50.00 U	50.00 U	100.00 U	100.00 U
EE4 20'-GW	40.00 U	70.00 U	80.00 U	50.00 U	50.00 U	100.00 U	100.00 U
EE5 10-20'	60.00 U	90.00 U	100.00 U	60.00 U	60.00 U	200.00 U	100.00 U
EE5 20'-GW	50.00 U	70.00 U	80.00 U	40.00 U	50.00 U	100.00 U	100.00 U
EE6 10-30'	40.00 U	70.00 U	70.00 U	70.00 U	70.00 U	100.00 U	80.00 U
EE6 30'-GW	40.00 U	70.00 U	70.00 U	60.00 U	60.00 U	100.00 U	80.00 U
EE7 10-30'	40.00 U	70.00 U	70.00 U	60.00 U	60.00 U	100.00 U	80.00 U
EE7 30'-GW	40.00 U	70.00 U	70.00 U	60.00 U	60.00 U	100.00 U	80.00 U
EE8 10-30'	40.00 U	70.00 U	70.00 U	60.00 U	60.00 U	100.00 U	80.00 U
EE8 30'-GW	40.00 U	70.00 U	70.00 U	70.00 U	60.00 U	100.00 U	80.00 U
EE9 10-30'	40.00 U	70.00 U	70.00 U	70.00 U	70.00 U	100.00 U	80.00 U
EE9 30'-GW	40.00 U	70.00 U	70.00 U	60.00 U	60.00 U	100.00 U	80.00 U

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF HERBICIDE RESULTS FOR SUBSURFACE SEDIMENT SAMPLES
COLLECTED JULY/AUGUST 1985
(ug/kg) DRY WEIGHT

SAMPLE	PARAMETER			
LOCATION	2,4-D	2,4,5-T	2,4,5-TP	MCPA
EE1 10-30 FT.	10U	5U	*	300U
EE1 30-GW	10U	5U	*	150U
EE2 10-30	25U	15U	15U	600U
EE2 30-GW	2U	1U	1U	40U
EE3 10-30	200U	100U	*	4700U
EE3 30-GW	320U	160U	*	200U
EE4 10-20	5U	3U	*	100U
EE4 20-GW	5U	3U	*	110U
EE5 10-20	5U	3U	*	110U
EE5 20-GW	10U	5U	*	200U
EE6 10-30	10U	5U	*	150U
EE6 30-GW	500U	250U	*	12000U
EE7 10-30	20U	10U	*	1100U
EE7 30-GW	10U	5U	*	500U
EE8 10-30	10U	5U	*	200U
EE8 30-GW	10U	5U	*	60U
EE9 10-30	50U	25U	*	1100U
EE9 30-GW	30U	15U	*	600U

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF TENTATIVELY IDENTIFIED BASE/NEUTRAL/ACID COMPOUNDS
FOR SUBSURFACE SEDIMENT SAMPLES COLLECTED JULY/AUGUST 1985
(ug/kg)

COMPOUND	SCAN	EE3 10-30'	EE3 20-GW	EE5 10-30'	EE9 30-GW
UNKNOWN	315	4200 J			
DIMETHYL BENZENE ISOMER	343	1700 J			
DIMETHYL BENZENE ISOMER	376	1200 J			
UNKNOWN	413	4600 J			
1-ETHYL-2-METHYL BENZENE	471	860 J			
TRIMETHYL BENZENE	510	1300 J			
DECANE	524	1800 J			
P-PHOSPHORIC ACID,TRIBUTYL ESTER	1106	1700 J			
UNKNOWN	1317	5900 J			
UNKNOWN	1333	2000 J			
UNKNOWN	1391	4200 J			
UNKNOWN	1424	7700 J			
UNKNOWN HYDROCARBON	636	2900 J			
UNKNOWN	1436	5000 J			
UNKNOWN	1453	1800 J			
UNKNOWN	1491	9400 J			
UNKNOWN	1505	2300 J			
UNKNOWN	1520	2400 J			
UNKNOWN	1542	3000 J			
2-BUTOXY ETHANOL	400		520 J		
UNKNOWN	1310		260 J		
UNKNOWN	1421			200 J	
UNKNOWN	416				220 J

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF INORGANIC RESULTS FOR SOIL/SEDIMENT SAMPLES
COLLECTED JULY/AUGUST 1985
(mg/kg) DRY WEIGHT

LOCATION	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER
EE1 10-30'	7315.00	6.00U	5.70	110.00	0.50	1.00U	12938.00	11.00	13.00	12.00
EE1 30-GW	6686.00	10.00	3.20U	101.00	0.50	1.00U	14123.00	10.00	13.00	11.00
EE2 10-30'	6888.00	6.00U	3.20U	97.00	0.50	1.00U	8862.00	10.00	11.00	11.00
EE2 30-GW	4728.00	8.00J	3.30U	81.00	0.40	1.00U	8247.00	7.00	11.00	11.00
EE3 10-30'	7692.00	7.00U	3.40U	114.00	0.30U	1.40	11516.00	28.00	11.00	19.00
EE3 30-GW	5346.00	6.00U	3.20U	92.00	0.30	1.00U	9899.00	7.00	13.00	12.00
EE4 10-20'	8810.00	8.00U	3.90U	119.00	0.60	1.20U	11785.00	12.00	14.00	12.00
EE4 20-GW	4831.00	6.00U	3.20U	88.00	0.30U	1.00U	9354.00	4.00	12.00	13.00
EE5 10-20'	8934.00	7.00U	7.10	119.00	0.60	1.00U	15703.00	13.00	13.00	12.00
EE5 20-GW	4671.00	6.00U	3.20U	79.00	0.40	1.00U	7616.00	6.00	11.00	10.00
EE6 10-30'	8332.00	4.00J	3.20U	106.00	0.50U	2.00U	12054.00	12.00	13.00	12.00
EE6 30-GW	7457.00	7.00U	3.30U	104.00	0.60	1.30	10995.00	10.00	15.00	11.00
EE7 10-30'	8712.00	8.00J	3.30U	103.00	0.50	1.00U	13000.00	12.00	13.00	17.00
EE7 30-GW	6140.00	6.00U	3.30U	112.00	0.30	1.00U	11285.00	8.00	11.00	14.00
EE8 10-30'	7046.00	6.00U	3.30U	104.00	0.50	1.00U	11053.00	12.00	12.00	10.00
EE8 30-GW	6215.00	6.00U	3.30U	99.00	0.50	1.10	10414.00	9.00	13.00	12.00
EE9 10-30'	7087.00	7.00U	3.30U	652.00	0.50	1.00U	10603.00	11.00	12.00	12.00
EE9 30-GW	5785.00	6.00U	3.30U	111.00	0.40	1.00U	10081.00	8.00	13.00	11.00

LOCATION	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM
EE1 10-30'	22753.00	5.70	6962.00	439.00	0.10U	8.00U	2551.00	1.80U	2.50	539.00
EE1 30-GW	23483.00	4.50	6210.00	377.00	0.10U	8.00U	2465.00	1.80U	3.20	535.00
EE2 10-30'	20000.00	5.90	5846.00	411.00	0.10U	9.00U	2610.00	1.90U	2.60	522.00
EE2 30-GW	21334.00	3.20	4549.00	345.00	0.10U	9.00U	1508.00	1.90U	2.30	592.00
EE3 10-30'	22319.00	100.00	6308.00	407.00	0.20	9.00U	2491.00	1.90U	1.80	647.00
EE3 30-GW	23074.00	6.20	4753.00	399.00	0.10U	9.00	1935.00	1.80U	1.90U	580.00
EE4 10-20'	27462.00	5.80	6943.00	485.00	0.10U	10.00U	2942.00	2.20U	2.70	665.00
EE4 20-GW	21375.00	3.60	4524.00	375.00	0.10U	8.00U	1711.00	9.00U	1.70U	528.00
EE5 10-20'	24879.00	8.10	8363.00	486.00	0.10U	14.00	2929.00	1.90U	2.80	725.00
EE5 20-GW	21489.00	2.90	4523.00	313.00	0.10U	8.00U	1888.00	1.80U	2.60	591.00
EE6 10-30'	24587.00	6.30	7076.00	447.00	0.20U	9.00	2523.00	4.00U	1.90	835.00
EE6 30-GW	26310.00	4.30	6043.00	447.00	0.10U	9.00U	2507.00	1.90U	3.40	669.00
EE7 10-30'	25832.00	9.70	7223.00	457.00	0.10U	11.00	2683.00	9.50U	2.50	726.00
EE7 10-GW	20780.00	3.80	5769.00	455.00	0.10U	9.00U	2515.00	1.90U	1.90	605.00
EE8 10-30'	20929.00	5.20	6165.00	398.00	0.10U	9.00U	2740.00	1.90U	3.50	562.00
EE8 30-GW	23027.00	4.50	5876.00	422.00	0.10U	9.00U	2225.00	1.90U	2.80	585.00
EE9 10-30'	21375.00	4.70	6283.00	390.00	0.60	9.00U	2761.00	1.90U	3.30	1406.00
EE9 30-GW	22263.00	4.40	5543.00	378.00	0.20	9.00U	2191.00	1.90U	2.20	605.00

LOCATION	THALLIUM	TIN	VANADIUM	ZINC	CYANIDE
EE1 10-30'	2.00 U	9.00 U	43.10	54.00	*
EE1 30-GW	2.00 U	10.00 U	47.00	50.00	*
EE2 10-30'	2.00 U	10.00 U	38.90	53.00	*
EE2 30-GW	2.00 U	10.00 U	40.50	43.00	*
EE3 10-30'	2.00 U	10.00 U	40.00	76.00	*
EE3 30-GW	2.00 U	10.00 U	45.00	45.00	*
EE4 10-20'	3.00 U	11.00 U	61.30	58.00	*
EE4 20-GW	2.00 U	9.00 U	42.30	42.00	*
EE5 10-20'	2.00 U	10.00 U	45.90	59.00	*
EE5 20-GW	2.00 U	9.00 U	41.80	40.00	*
EE6 10-30'	5.00 U	10.00 U	48.80	68.00	*
EE6 30-GW	2.00 U	10.00 U	56.80	56.00	*
EE7 10-30'	2.00 U	10.00 U	49.30	218.00	*
EE7 30-GW	2.00 U	10.00 U	35.70	59.00	*
EE8 10-30'	2.00 U	10.00 U	42.40	49.00	*
EE8 30-GW	2.00 U	10.00 U	46.00	47.00	*
EE9 10-30'	2.00 U	10.00 U	43.60	49.00	*
EE9 30-GW	2.00 U	10.00 U	43.90	47.00	*

APPENDIX G

GROUND WATER ANALYTICAL RESULTS

Explanation of data modifiers:

U:	undetected at specified level
J:	estimated concentration only
R:	value rejected during Quality Assurance review
*:	not analyzed for
SCAN:	Relative Retention Time Indicator

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF VOLATILE ORGANIC COMPOUND RESULTS
FOR GROUNDWATER SAMPLES COLLECTED JULY/AUGUST 1985
(ug/l)

LOCATION	CHLOROMETHANE	BROMOMETHANE	VINYL CHLORIDE	CHLOROETHANE	METHYLENE CHLORIDE	ACETONE	CARBON DISULFIDE	1,1-DICHLORO ETHANE	1,1-DICHLORO ETHANE
EE1	50.00 U	50.00 U	50.00 U	50.00 U	15.00 U	765.00	25.00 U	25.00 U	25.00 U
EE2	10.00 U	10.00 U	10.00 U	10.00 U	2.00 U	84.00 U	5.00 U	5 00	15.00
EE3	100.00 U	100.00 U	100.00 U	100.00 U	60.00 U	350.00	50.00 U	50.00 U	64.00
EE4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	330.00	5.00 U	5.00 U	5.00 U
EE5	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	3.60 J	5.00 U	5.00 U	5.00 U
EE6	100.00 U	100.00 U	100.00 U	100.00 U	40.00	710.00	50.00 U	50.00 U	50.00 U
EE7	200.00 U	200.00 U	200.00 U	200.00 U	72.00	10400.00 U	100.00 U	100.00 U	100.00 U
EE8	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	10.00 U	5.00 U	5.00 U	5.00 U
EE9	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	10.00 U	5.00 U	5.00 U	5.00 U
JUB CNTR	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	354.00	5.00 U	5.00 U	5.00 U
JUB 1	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	47.00	5.00 U	5.00 U	5.00 U
JUB 2	10.00 U	10.00 U	10.00 U	10.00 U	1.00 U	48.00	5.00 U	13.00	35.00
JUB 3	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	1.30 J	5.00 U	5.00 U	5.00 U
JUB 4	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	4.80 J	5.00 U	5.00 U	5.00 U
WSW	10.00 U	10.00 U	10.00 U	10.00 U	5.00 U	4.40 J	5.00 U	5.00 U	5.00 U

LOCATION	TRANS-1,2-DI CHLOROETHENE	CHLOROFORM	1,2-DICHLORO ETHANE	2-BUTANONE	1,1,1-TRI CHLOROETHANE	CARBON TETRA CHLORIDE	VINYL ACETATE	BROMODICHLORO METHANE	1,1,2,2-TETRA CHLOROETHANE
EE1	25.00 U	25.00 U	25.00 U	50.00 U	25.00 U	25.00 U	50.00 U	25.00 U	25.00 U
EE2	9.00	3.00	5.00 U	10.00 U	70.00	5.00 U	10.00 U	5.00 U	5.00 U
EE3	50.00 U	50.00 U	50.00 U	100.00 U	420.00	50.00 U	100.00 U	50.00 U	50.00 U
EE4	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
EE5	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
EE6	50.00 U	50.00 U	50.00 U	100.00 U	50.00 U	50.00 U	100.00 U	50.00 U	50.00 U
EE7	100.00 U	100.00 U	100.00 U	200.00 U	100.00 U	100.00 U	200.00 U	100.00 U	100.00 U
EE8	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
EE9	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
JUB CNTR	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
JUB 1	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
JUB 2	15.00	17.00	4.60 J	10.00 U	168.00	5.00 U	10.00 U	5.00 U	5.00 U
JUB 3	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
JUB 4	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U
WSW	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U	10.00 U	5.00 U	5.00 U

LOCATION	1,2-DICHLORO PROPANE	TRANS-1,3-DI CHLOROPROPENE	TRICHLORO ETHENE	DIBROMOCHLORO METHANE	1,1,2-TRI CHLOROETHANE	BENZENE	CIS-1,3-DI CHLOROPROPENE	2-CHLOROETHYL VINYL ETHER	BROMOFORM
EE1	25.00 U	25.00 U	25.00 U	25.00 U	25.00 U	25.00 U	25.00 U	50.00 U	25.00 U
EE2	5.00 U	5.00 U	65.00	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
EE3	50.00 U	50.00 U	480.00	50.00 U	50.00 U	50.00 U	50.00 U	100.00 U	50.00 U
EE4	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
EE5	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
EE6	50.00 U	50.00 U	50.00 U	50.00 U	50.00 U	50.00 U	50.00 U	100.00 U	50.00 U
EE7	100.00 U	100.00 U	100.00 U	100.00 U	100.00 U	100.00 U	100.00 U	200.00 U	100.00 U
EE8	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
EE9	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
JUB CNTR	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
JUB 1	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
JUB 2	5.00 U	5.00 U	164.00	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
JUB 3	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
JUB 4	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U
WSW	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.00 U	5.00 U

LOCATION	2-HEXANONE	4-METHYL-2-PENTANONE	TETRACHLORO ETHYLENE	TOLUENE	CHLOROBENZENE	ETHYL BENZENE	STYRENE	TOTAL XYLENES
EE1	50.00 U	50.00 U	25.00 U	25.00 U	25.00 U	25.00 U	25.00 U	25.00 U
EE2	10.00 U	10.00 U	32.00	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
EE3	100.00 U	100.00 U	50.00 U	230.00	50.00 U	50.00 U	50.00 U	63.00
EE4	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
EE5	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
EE6	100.00 U	100.00 U	50.00 U	50.00 U	50.00 U	50.00 U	50.00 U	50.00 U
EE7	200.00 U	200.00 U	100.00 U	100.00 U	100.00 U	100.00 U	100.00 U	100.00 U
EE8	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
EE9	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
JUB CNTR	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
JUB 1	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
JUB 2	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
JUB 3	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
JUB 4	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
WSW	10.00 U	10.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF BASE/NEUTRAL/ACID COMPOUND RESULTS
FOR GROUNDWATER SAMPLES COLLECTED JULY/AUGUST 1985
(ug/l)

LOCATION	N-NITROSO DIMETHYLAMINE	PHENOL	ANILINE	BIS(2-CHLORO ETHYL)ETHER	2-CHLOROPHENOL	1,3-DICHLORO BENZENE	1,4-DICHLORO BENZENE	BENZYL ALCOHOL
EE1	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE2	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE3	20.00 U	20.00 R	20.00 U	20.00 U	20.00 R	20.00 U	20.00 U	20.00 U
EE4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE5	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE6	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE7	24.00 R	24.00 U	24.00 R	24.00 R	24.00 U	24.00 R	24.00 R	24.00 R
EE8	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE9	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
JUB CNTR	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB1	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB2	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB3	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
WSW	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U

LOCATION	1,2-DICHLORO BENZENE	2-METHYLPHENOL	BIS(2CHLOROISO PROPYL)ETHER	4-METHYL PHENOL	N-NITROSO DIPROPYLAMINE	HEXACHLORO ETHANE	NITROBENZENE	ISOPHORONE
EE1	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE2	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE3	20.00 U	20.00 R	20.00 U	6.00 J	10.00 U	10.00 U	10.00 U	10.00 U
EE4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE5	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE6	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE7	24.00 R	24.00 U	24.00 R	24.00 U	24.00 R	24.00 R	24.00 R	24.00 R
EE8	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE9	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
JUB CNTR	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB1	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB2	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB3	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
WSW	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U

LOCATION	2-NITROPHENOL	2,4-DIMETHYL PHENOL	BENZOIC ACID	BIS(2-CHLORO ETHOXY)METHANE	2,4-DICHLORO PHENOL	1,2,4-TRI CHLOROBENZENE	NAPHTHALENE	4-CHLORO ANILINE
EE1	20.00 U	20.00 U	100.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE2	20.00 U	20.00 U	100.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE3	10.00 R	10.00 R	100.00 R	20.00 U	20.00 R	20.00 U	20.00 U	20.00 U
EE4	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE5	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE6	20.00 U	20.00 U	100.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE7	24.00 U	24.00 U	118.00 U	24.00 R	24.00 U	24.00 R	24.00 R	24.00 R
EE8	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE9	20.00 U	20.00 U	100.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
JUB CNTR	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 1	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 2	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 3	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 4	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
WSW	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U

LOCATION	HEXACHLORO BUTADIENE	4-CHLORO-3-METHYLPHENOL	2-METHYL NAPHTHALENE	HEXACHLOROCY CLOPENTADIENE	2,4,6-TRI CHLOROPHENOL	2,4,5-TRI CHLOROPHENOL
EE1	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	100.00 U
EE2	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	100.00 U
EE3	20.00 U	20.00 R	20.00 U	20.00 U	20.00 R	100.00 R
EE4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
EE5	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
EE6	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	100.00 U
EE7	24.00 R	24.00 U	24.00 R	24.00 R	24.00 U	118.00 U
EE8	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
EE9	20.00 U	20.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB CNTR	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 1	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 2	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 3	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
WSW	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U

LOCATION	2-CHLORO NAPHTHALENE	2-NITROANILINE	DIMETHYL PHTHALATE	ACENAPHTHYLENE	3-NITROANILINE	ACENAPHTHENE	2,4-DINITRO PHENOL
EE1	20.00 U	100.00 U	20.00 U	20.00 U	100.00 U	20.00 U	100.00 U
EE2	20.00 U	100.00 U	20.00 U	20.00 U	100.00 U	20.00 U	100.00 U
EE3	20.00 U	100.00 U	20.00 U	20.00 U	100.00 U	20.00 U	100.00 R
EE4	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
EE5	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
EE6	20.00 U	100.00 U	20.00 U	20.00 U	100.00 U	20.00 U	100.00 U
EE7	24.00 R	118.00 R	24.00 R	24.00 R	118.00 R	24.00 R	59.00 U
EE8	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
EE9	10.00 U	50.00 U	10.00 U	10.00 U	100.00 U	20.00 U	100.00 U
JUB CNTR	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
JUB 1	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
JUB 2	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
JUB 3	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
JUB 4	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U
WSW	10.00 U	50.00 U	10.00 U	10.00 U	50.00 U	10.00 U	50.00 U

LOCATION	4-NITROPHENOL	DIBENZOFURAN	2,4-DINITRO TOLUENE	2,6-DINITRO TOLUENE	DIETHYL PHTHALATE	4-CHLOROPHENYL PHENYL ETHER	FLUORENE	4-NITROANILENE
EE1	100.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	100.00 U
EE2	100.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	100.00 U
EE3	100.00 R	20.00 U	20.00 R	20.00 U	20.00 U	20.00 U	20.00 U	100.00 U
EE4	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
EE5	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
EE6	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	100.00 U
EE7	59.00 U	24.00 R	24.00 R	24.00 R	24.00 R	24.00 R	24.00 R	118.00 R
EE8	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
EE9	100.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	100.00 U
JUB CNTR	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 1	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 2	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 3	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
JUB 4	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U
WSW	50.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	50.00 U

LOCATION	4,6-DINITRO-2 METHYLPHENOL	N-NITROSODI PHENYLAMINE	4-BROMOPHENYL PHENYL ETHER	HEXACHLORO BENZENE	PENTACHLORO PHENOL	PHENANTHRENE	ANTHRACENE	DI-N-BUTYL PHTHALATE
EE1	100.00 U	20.00 U	20.00 U	20.00 U	118.00 U	20.00 U	20.00 U	20.00 U
EE2	100.00 U	20.00 U	20.00 U	20.00 U	100.00 U	20.00 U	20.00 U	20.00 U
EE3	100.00 R	20.00 U	20.00 U	20.00 U	20.00 R	20.00 U	20.00 U	20.00 U
EE4	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
EE5	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
EE6	100.00 U	20.00 U	10.00 U	10.00 U	100.00 U	10.00 U	20.00 U	20.00 U
EE7	118.00 R	24.00 R	24.00 R	24.00 R	118.00 U	24.00 R	24.00 R	24.00 R
EE8	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
EE9	100.00 U	20.00 U	20.00 U	20.00 U	50.00 U	20.00 U	20.00 U	20.00 U
JUB CNTR	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
JUB 1	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
JUB 2	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
JUB 3	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
JUB 4	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U
WSW	50.00 U	10.00 U	10.00 U	10.00 U	50.00 U	10.00 U	10.00 U	10.00 U

LOCATION	FLUORANTHENE	BENZIDINE	PYRENE	BUTYL BENZYL PHTHALATE	3,3'-DICHLORO BENZIDINE	BENZO(A) ANTHRACENE	BIS(2-ETHYL HEXYL)PHTHALATE	CHRYSENE	DI-N-OCTYL PHTHALATE
EE1	20.00 U	160.00 U	20.00 U	20.00 U	40.00 U	20.00 U	44.00 U	20.00 U	10.00 U
EE2	20.00 U	160.00 U	20.00 U	20.00 U	40.00 U	20.00 U	6.00 J	20.00 U	20.00 U
EE3	20.00 U	160.00 U	20.00 U	20.00 U	40.00 U	20.00 U	10.00 U	20.00 U	20.00 U
EE4	10.00 U	50.00 U	10.00 U	10.00 U	20.00 U	10.00 U	39.00	10.00 U	10.00 U
EE5	10.00 U	50.00 U	10.00 U	10.00 U	20.00 U	10.00 U	7.80 J	10.00 U	10.00 U
EE6	20.00 U	100.00 U	10.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	6.00 U
EE7	24.00 R	118.00 R	24.00 R	24.00 R	48.00 R	24.00 R	18.00 U	24.00 R	24.00 R
EE8	10.00 U	50.00 U	10.00 U	10.00 U	20.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE9	20.00 U	160.00 U	20.00 U	20.00 U	40.00 U	20.00 U	40.00 U	20.00 U	12.00 U
JUB CNTR	10.00 U	50.00 U	10.00 U	10.00 U	20.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 1	10.00 U	50.00 U	10.00 U	10.00 U	20.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 2	10.00 U	50.00 U	10.00 U	10.00 U	20.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 3	10.00 U	50.00 U	10.00 U	10.00 U	20.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 4	10.00 U	100.00 U	10.00 U	10.00 U	20.00 U	10.00 U	10.00 U	10.00 U	10.00 U
WSW	10.00 U	100.00 U	10.00 U	10.00 U	20.00 U	10.00 U	10.00 U	10.00 U	10.00 U

LOCATION	BENZO(B) FLUORANTHENE	BENZO(K) FLUORANTHENE	BENZO(A)PYRENE	INDENO(1,2,3-CD)PYRENE	DIBENZ(A,H) ANTHRACENE	BENZO(G,H,I) PERYLENE
EE1	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE2	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE3	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE5	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE6	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
EE7	24.00 R	24.00 R	24.00 R	24.00 R	24.00 R	24.00 R
EE8	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
EE9	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U	20.00 U
JUB CNTR	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 1	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 2	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 3	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
JUB 4	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
WSW	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF PESTICIDE AND PCB/RESULTS FOR
GROUNDWATER SAMPLES COLLECTED JULY/AUGUST 1985
(ug/l)

LOCATION	ALPHA-BHC	BETA-BHC	DELTA-BHC	GAMMA-BHC (LINDANE)	HEPTACHLOR	ALDRIN	HEPTACHLOR EPOXIDE	ENDOSULFAN I	DIELDRIN	4,4'-DDE
EE1	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
EE2	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
EE3	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
EE4	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
EE5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
EE6	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
EE7	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
EE8	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.11 U	0.11 U
EE9	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.11 U	0.11 U
JUB CNTR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
JUB 1	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
JUB 2	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
JUB 3	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
JUB 4	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U
WSW	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.10 U	0.10 U

LOCATION	ENDRIN	ENDOSULFAN II	4,4'-DDD	ENDRIN ALDEHYDE	ENDOSULFAN SULFATE	4,4'-DDT	ENDRIN KETONE	METHOXY-CHLOR	CHORDANE	TOXAPHENE
EE1	0.10 U	0.10 U	0.10 UJ	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
EE2	0.10 UJ	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
EE3	0.10 UJ	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
EE4	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
EE5	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
EE6	0.10 UJ	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
EE7	0.10 UJ	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
EE8	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.60 U	0.60 U	1.10 U
EE9	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.60 U	0.60 U	1.10 U
JUB CNTR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
JUB 1	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
JUB 2	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
JUB 3	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
JUB 4	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U
WSW	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U	1.00 U

LOCATION	AROCLOR-1016	AROCLOR-1221	AROCLOR-1232	AROCLOR-1242	AROCLOR-1248	AROCLOR-1254	AROCLOR-1260
EE1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	1.00 U
EE2	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	1.00 U
EE3	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	1.00 U
EE4	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U
EE5	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U
EE6	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	1.00 U
EE7	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	1.00 U
EE8	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	1.10 U	1.10 U
EE9	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	1.10 U	0.60 U
JUB CNTR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U
JUB 1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	1.00 U
JUB 2	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U
JUB 3	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U
JUB 4	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U
WSW	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	1.00 U

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF HERBICIDE RESULTS FOR GROUNDWATER SAMPLES
COLLECTED JULY/AUGUST 1985
(ug/l)

SAMPLE	PARAMETER			
LOCATION	2,4-D	2,4,5-T	2,4,5-TP	MCPA
EE1	1U	1U	*	2U
EE2	1U	1U	1U	2U
EE3	1U	1U	1U	2U
EE4	1U	1U	*	2U
EE5	1U	1U	*	2U
EE6	1U	1U	*	2U
EE7	1U	1U	*	2U
EE8	1U	1U	*	2U
EE9	1U	1U	*	2U
JUB CONTROL	1U	1U	1U	2U
JUB 1	1U	1U	1U	2U
JUB 2	1U	1U	1U	2U
JUB 3	1U	1U	1U	2U
JUB 4	1U	1U	1U	1U
WSW	1U	1U	1U	2U

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF TENTATIVELY IDENTIFIED BASE/NEUTRAL/ACID COMPOUNDS FOR
GROUNDWATER SAMPLES COLLECTED JULY/AUGUST 1985
(ug/l)

LOCATION:		EE1	EE2	EE3	EE4	EE5	EE6	EE7	EE8	EE9	JUB CNTR	JUB1	JUB2	JUB3	JUB4	WSW
COMPOUND	SCAN															
ALCOHOL	431	190J														
ALCOHOL	518	20J														
ALKENE	663	600J	16J				62J									
HYDROCARBON	704	22J														
CARBOXYLIC ACID	914	12J														
CARBOXYLIC ACID	954	94J														
UNK.	2078	26J	8J	4J		15J	68J	12J								
SATURATED HYDROCARBON	965		22J													
UNK.	1812		6J													
DIMETHYL BENZENE	406			696J												
DIMETHYL BENZENE	445			364J												
ALKYL BENZENE	499			12J												
SUBSTITUTED BENZENE	546			26J												
ALKYL BENZENE	559			120J												
TRIMETHYL BENZENE	569			42J												
METHYL KETONE	576			6J												
ALKYL BENZENE	586			40J												
ALKYL BENZENE	606			84J												
ALKYL BENZENE	648			20J												
ALKYL BENZENE	665			6J												

SUMMARY OF TENTATIVELY IDENTIFIED BASE/NEUTRAL/ACID COMPOUNDS (CONT.)

LOCATION:		EE1	EE2	EE3	EE4	EE5	EE6	EE7	EE8	EE9	JUB CNTR	JUB1	JUB2	JUB3	JUB4	WSW
COMPOUND	SCAN															
SUBSTITUTED ALKANE	670			16J												
SUBSTITUTED ALKANE	879			8J												
KETONE	934			16J												
KETONE	960						160J									
UNK.	1487						12J									
SUBST. CARBOXYLIC ACID	964							158J								
UNKNOWN	1563								14J							
UNKNOWN	2036								6J							
PHTHALATE	2150								6J							
UNKNOWN	1166									18J						
UNKNOWN	1323									8J						
UNKNOWN	2035									4J						
UNKNOWN	394				6.7J											
HYDROCARBON	232				11J											
UNKNOWN	1183				27J											
HEXADECANOIC ACID	1502				18J											
UNKNOWN	1635				22J											
UNKNOWN	1638				25J											
CARBOXYLIC ACID	1654										7.6J	6.2J		4.8J	5.6J	
C-3 SUBST. BENZENE	468											6.2J		4.8J	7.2J	
C-2 SUBST. BENZENE	343												13J			

RESOURCE RECOVERY CORP., PASCO, WA.
SUMMARY OF INORGANIC RESULTS FOR GROUND WATER SAMPLES COLLECTED
JULY/AUGUST 1985
(ug/l)

LOCATION	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER
EE1 BKGRD.	2413.00	12.00 U	10.00 U	103.00	0.50 U	1.90 U	57990.00	24.00	3.90 U	10.00
EE2	70420.00	19.00 J	10.00 U	1929.00	4.50	2.30	190000.00	134.00	102.00	191.00
EE3	8983.00	12.00 U	10.00 U	297.00	0.50 U	1.90 U	101500.00	48.00	15.00	22.00
EE4	4846.00	12.00 U	10.00 U	154.00	1.20	3.50	65940.00	16.00	5.00	13.00
EE5	51330.00	12.00 U	10.00 U	2148.00	4.30	2.90	145500.00	83.00	70.00	118.00
EE6	22560.00	16.00 J	10.00 U	400.00	1.10	2.70	70920.00	51.00	32.00	82.00
EE7	9291.00	12.00 U	10.00 U	235.00	0.50 U	1.90 U	65910.00	62.00	12.00	40.00
EE8	18320.00	12.00 U	10.00 U	526.00	2.10	1.90 U	80770.00	62.00	25.00	45.00
EE9	26390.00	12.00 U	11.40 J	773.00	2.70	1.90 U	94780.00	72.00	38.00	62.00
JUB WELL 1	37210.00	12.00 U	10.00 U	896.00	3.10	2.80	101100.00	60.00	67.00	103.00
JUB WELL 2	46670.00	12.00 U	12.00	834.00	3.60	1.90 U	116100.00	71.00	87.00	109.00
JUB WELL 3	17030.00	12.00 U	10.00 U	350.00	1.70	1.90 U	77740.00	31.00	23.00	33.00
JUB WELL 4	40180.00	12.00 U	40.00	838.00	3.00	1.90 U	100700.00	51.00	44.00	77.00
JUB CNTR.	129800.00	12.00 U	37.20	1656.00	10.40	1.90 U	332200.00	176.00	184.00	254.00
WSW	61.00	12.00 U	10.00 U	63.00	0.60	1.90 U	57180.00	11.00	3.90 U	1.70

LOCATION	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM
EE1 BKGRD.	4349.00	5.00 R	21880.00	147.00	0.18 U	24.00	8561.00	25.00 U	3.30 U	35780.00
EE2	167600.00	36.20 R	64500.00	3631.00	0.20	131.00	20700.00	25.00 U	7.80	47580.00
EE3	27090.00	5.90 R	27570.00	2698.00	0.18 U	21.00	11690.00	25.00 U	3.30 U	31920.00
EE4	10630.00	10.50	21330.00	244.00	0.40 U	19.00	7563.00	25.00 U	4.00	32540.00
EE5	123700.00	17.90	49050.00	2736.00	0.20 U	80.00	13800.00	25.00 U	7.60	37270.00
EE6	52150.00	29.10 R	29930.00	1488.00	0.18 U	50.00	9989.00	25.00 U	3.30 U	36130.00
EE7	21750.00	17.90 R	24040.00	709.00	0.18 U	46.00	8855.00	25.00 U	3.30 U	35220.00
EE8	39950.00	84.00 R	29600.00	887.00	0.18 U	46.00	9272.00	25.00 U	6.40	34140.00
EE9	61640.00	33.60 R	31280.00	1264.00	0.30	78.00	12880.00	25.00 U	6.80	32670.00
JUB WELL 1	89890.00	70.00	38990.00	2695.00	0.60	61.00	12410.00 J	25.00 U	9.80	35960.00
JUB WELL 2	105400.00	56.00	41490.00	2232.00	0.20	50.00	13420.00 J	25.00 U	11.10	39370.00
JUB WELL 3	41430.00	13.20	29140.00	733.00	0.60	16.00 U	9598.00 J	25.00 U	8.00	35140.00
JUB WELL 4	95460.00	15.30	39840.00	1394.00	0.20	23.00	12290.00 J	25.00 U	9.30	36120.00
JUB CNTR.	268300.00	180.00	99060.00	5281.00	1.00	138.00	26000.00 J	25.00 U	19.10	41800.00
WSW	24.00	5.00	20600.00	3.00	0.18 U	16.00 U	7315.00 J	5.00 U	5.60	33440.00

LOCATION	THALLIUM	TIN	VANADIUM	ZINC	CYANIDE
EE1 BKGRD.	10.00 U	18.00 U	15.90 J	289.00	*
EE2	10.00 U	18.00 U	281.90 J	443.00	*
EE3	10.00 U	18.00 U	46.40 J	75.00	*
EE4	10.00 U	18.00 U	38.70	142.00	*
EE5	10.00 U	18.00 U	191.80	336.00	*
EE6	10.00 U	18.00 U	111.30 J	297.00	*
EE7	10.00 U	18.00 U	53.80 J	346.00	*
EE8	10.00 U	18.00 U	89.40 J	160.00	*
EE9	10.00 U	18.00 U	116.00 J	439.00	*
JUB WELL 1	10.00 U	18.00 U	164.50	262.00	*
JUB WELL 2	10.00 U	88.00	195.80	354.00	*
JUB WELL 3	10.00 U	18.00 U	79.40	132.00	*
JUB WELL 4	10.00 U	52.00	150.00	211.00	*
JUB CNTR.	10.00 U	18.00 U	493.70	673.00	*
WSW	10.00 U	21.00	23.50	8.00	*